Amendments to the Drawings:

Amendments to the drawings have previously been approved. Applicant files replacement formal drawings incorporating these changes.

OIPE JC26
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Applicants: Yoshiyuki Tanaka, et al.
Serial No. 09/130,818
Reply to final Office Action dated September 4, 2003
Attorney: William H. Wright Tel: (213) 337-6700
Docket No.: 81788.0163

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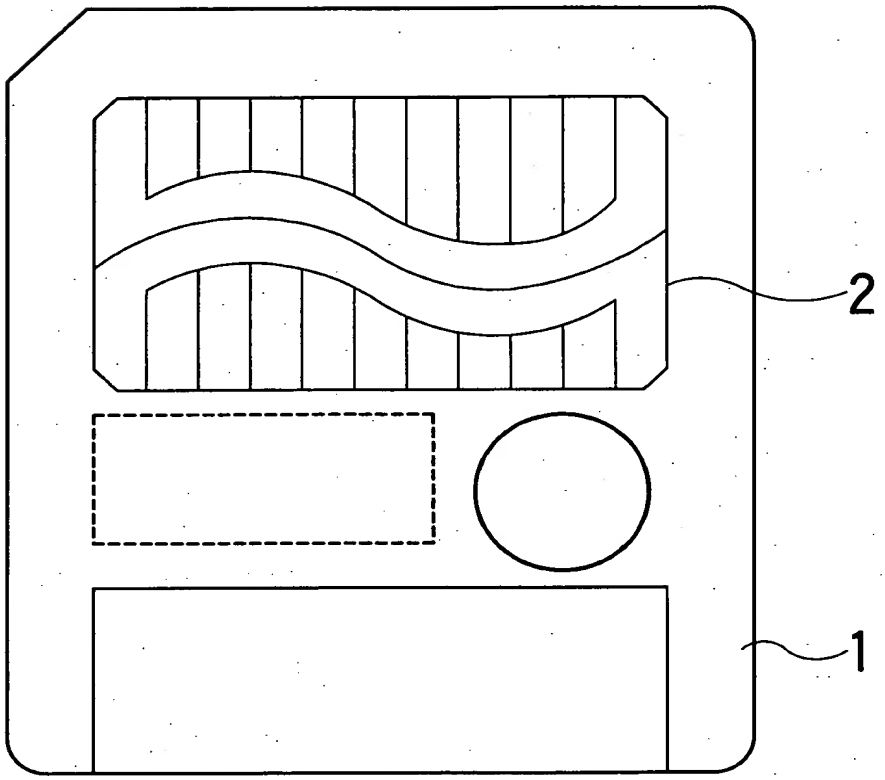

FIG. 1

PRIOR ART

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		0 255	256 263
PHYSICAL BLOCK 0	Page 0	DATA AREA (256BYTES)	REDUNDANT DIVISION (16BYTES)
	Page 1		
	⋮		
	Page 15		
PHYSICAL BLOCK 1	Page 0		
	Page 1		
	⋮		
	Page 15		
⋮	⋮	⋮	⋮
PHYSICAL BLOCK 511	Page 0		
	Page 1		
	⋮		
	Page 15		

FIG. 2

PRIOR ART

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PHYSICAL BLOCK 0	SECTOR 0	512 BYTES
	SECTOR 1	
	⋮	
	SECTOR 7	
PHYSICAL BLOCK 1	SECTOR 8	
	SECTOR 9	
	⋮	
	SECTOR 15	
⋮	⋮	⋮
PHYSICAL BLOCK 499	SECTOR 3992	
	SECTOR 3993	
	⋮	
	SECTOR 3999	

FIG. 3

PRIOR ART

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DATA DIVISION

BYTE	PAGE 0(EVEN PAGE)	PAGE 1(ODD PAGE)
0~255	DATA Area-1	DATA Area-2

REDUNDANT DIVISION

BYTE	EVEN PAGE	ODD PAGE
256	User Data Area	ECC Area-2
257		
258		
259		Block Address Area-2
260	Data Status Area	
261	Block Status Area	ECC Area-1
262	Block Address Area-1	
263		

FIG. 4

PRIOR ART

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		0 511 DATA AREA	512 527 REDUNDANT DIVISION (16BYTES)
PHYSICAL BLOCK 0	Page 0		
	Page 1		
	⋮		
	Page 15		
PHYSICAL BLOCK 1	Page 0		
	Page 1		
	⋮		
	Page 15		
⋮	⋮	⋮	⋮
PHYSICAL BLOCK 1023	Page 0		
	Page 1		
	⋮		
	Page 15		

FIG.5

PRIOR ART

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LOGICAL BLOCK 0	SECTOR 0	512 BYTES
	SECTOR 1	
	⋮	
	SECTOR 15	
LOGICAL BLOCK 1	SECTOR 16	
	SECTOR 17	
	⋮	
	SECTOR 31	
⋮	⋮	⋮
LOGICAL BLOCK 999	SECTOR 15984	
	SECTOR 15985	
	⋮	
	SECTOR 15999	

FIG. 6

PRIOR ART

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DATA DIVISION

BYTE	
0~511	DATA Area

REDUNDANT DIVISION

BYTE	
512	User Data Area
513	
514	
515	
516	Data Status Area
517	Block Status Area
518	Block Address Area-1
519	
520	ECC Area-2
521	
522	
523	Block Address Area-2
524	
525	ECC Area-1
526	
527	

FIG. 7

PRIOR ART

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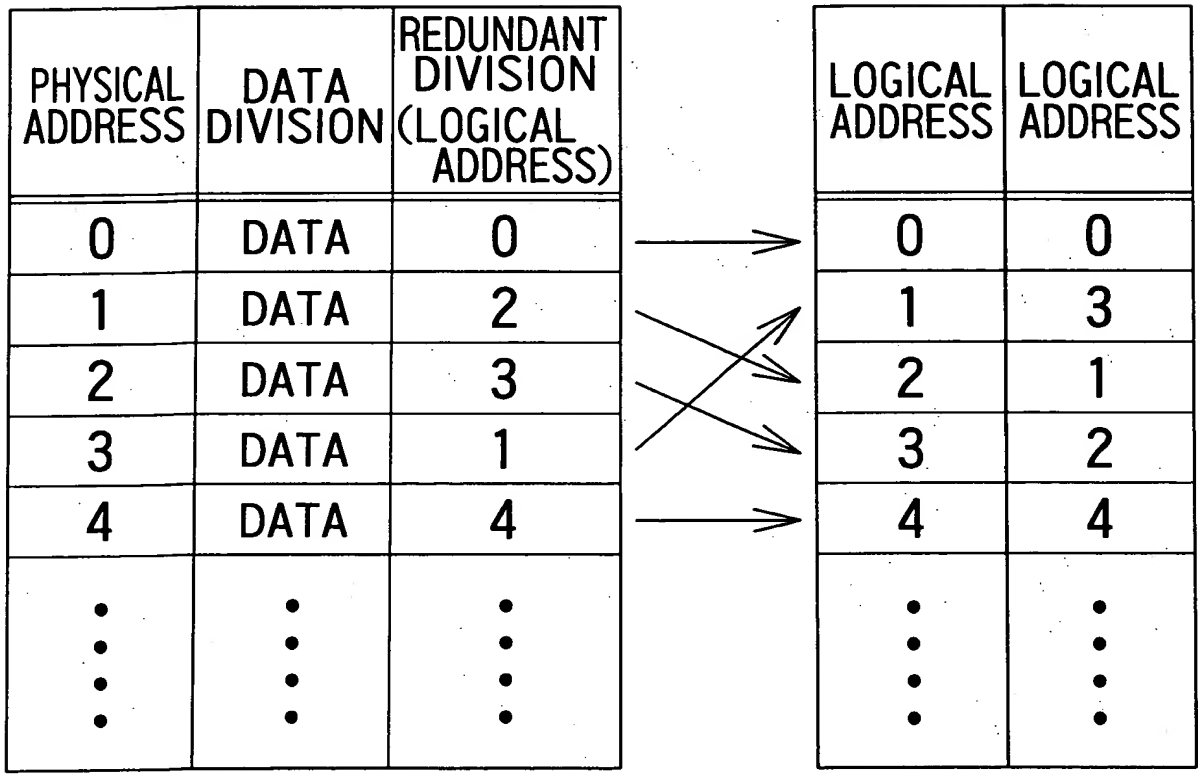

FIG. 8

PRIOR ART

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OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)			
		UPPER BYTE		LOWER BYTE	
word0(LBA=0)	0	0000	0000	0000	0000
word1(LBA=1)	500	0000	0001	1111	0100
word2(LBA=2)	327	0000	0001	0100	0111
⋮	⋮	⋮	⋮	⋮	⋮
word497(LBA=497)	244	0000	0000	1111	0100
word498(LBA=498)	249	0000	0001	1110	1111
word499(LBA=499)	128	0000	0001	1000	0000

FIG. 9
PRIOR ART

OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)			
		UPPER BYTE		LOWER BYTE	
word0(LBA=0)	0	0000	0000	0000	0000
word1(LBA=1)	1000	0000	0011	1110	1000
word2(LBA=2)	654	0000	0010	1000	1110
⋮	⋮	⋮	⋮	⋮	⋮
word997(LBA=997)	488	0000	0001	1110	1000
word998(LBA=998)	498	0000	0001	1111	0010
word999(LBA=999)	256	0000	0001	0000	0000

FIG. 10
PRIOR ART

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D7	D6	D5	D4	D3	D2	D1	D0	256 + 8 BYTE/PAGE
0	0	0	1	BA10	BA9	BA8	BA7	262 BYTE(EVEN PAGE) 259 BYTE(ODD PAGE)
BA6	BA5	BA4	BA3	BA2	BA1	BA0	P	263 BYTE(EVEN PAGE) 260 BYTE(ODD PAGE)

BA10~BA0:LOGICAL BLOCK ADDRESS
P EVEN PARITY BIT "1" FIXED VALUE

FIG. 11
PRIOR ART

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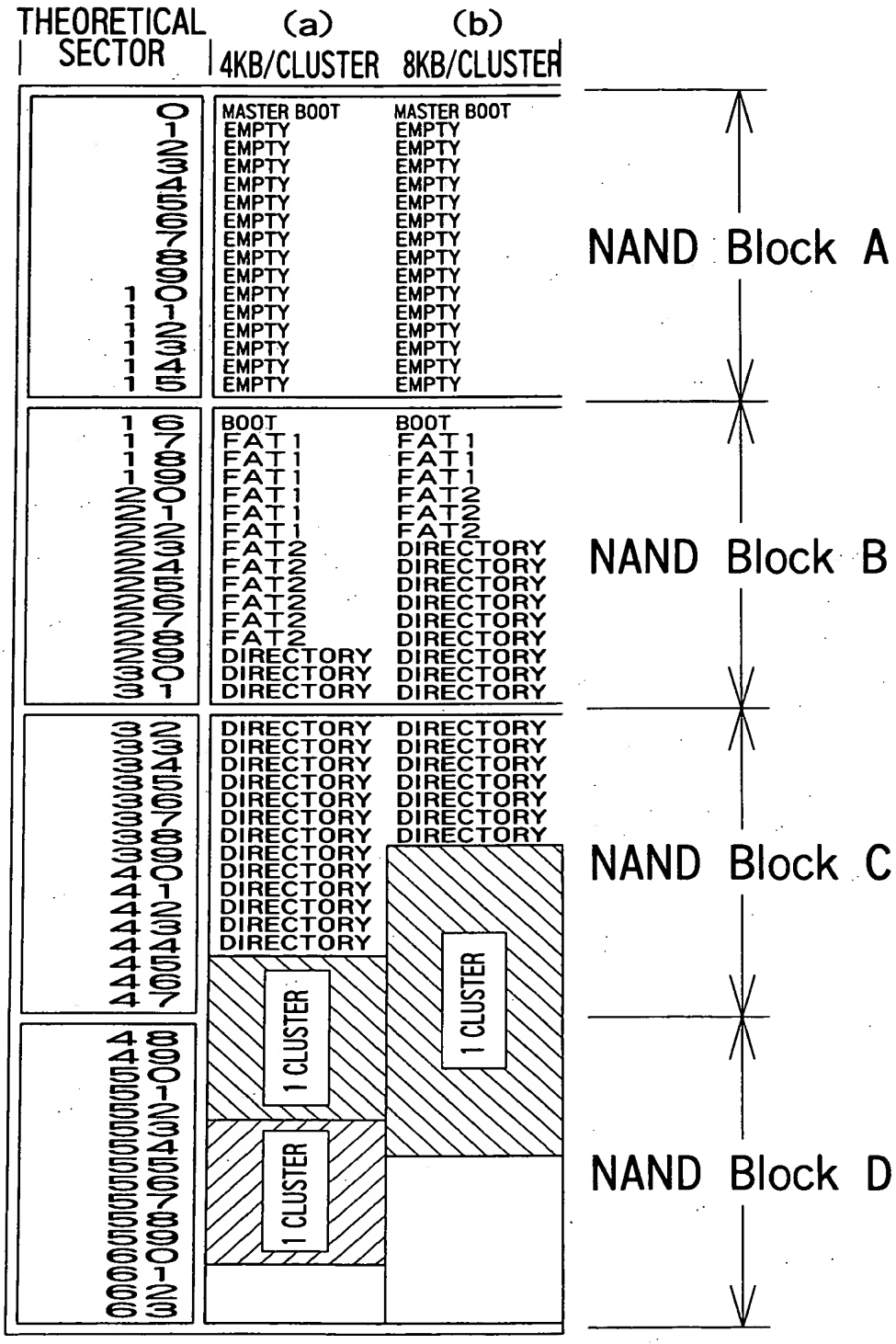

FIG. 12

PRIOR ART

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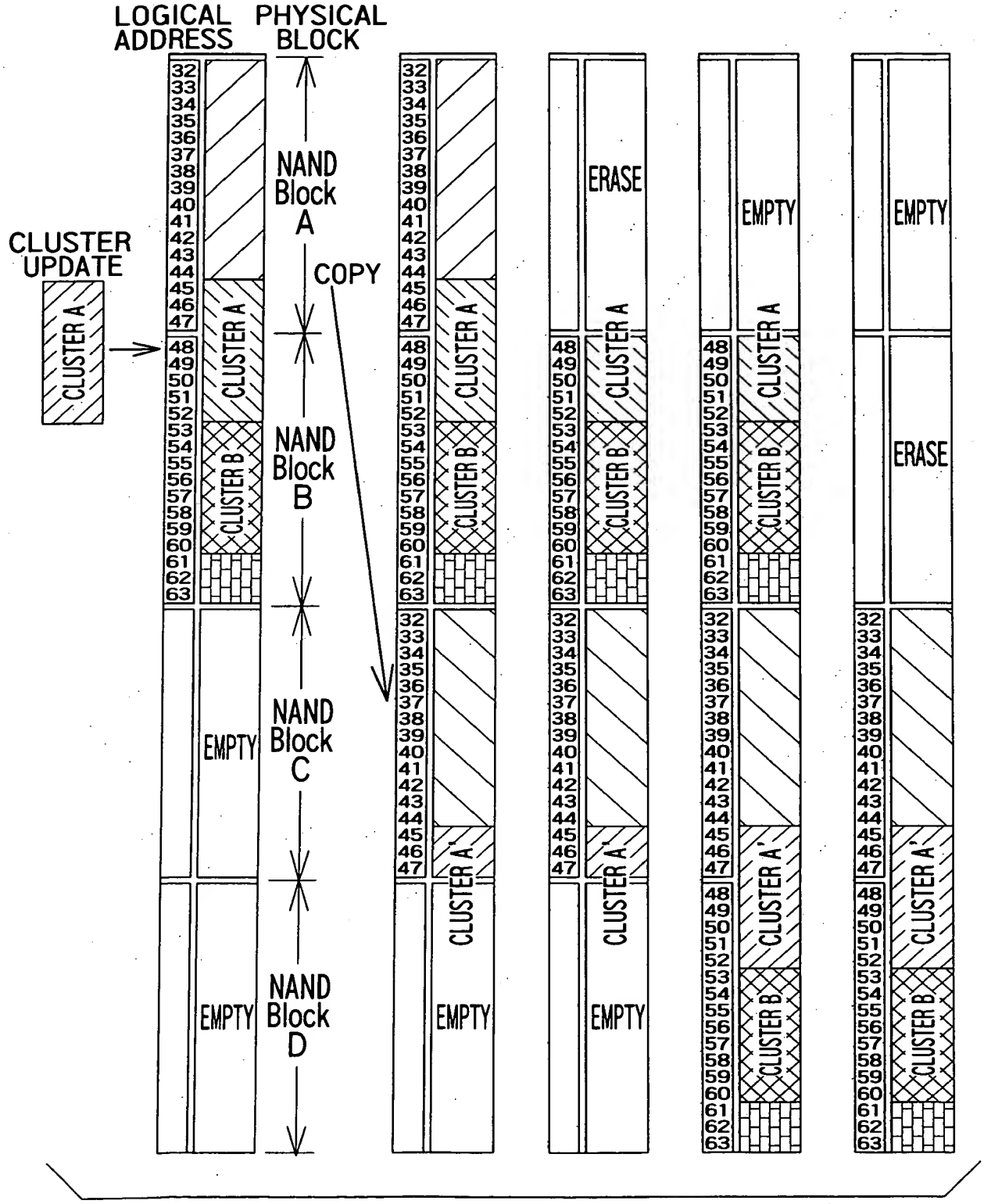

FIG. 13

PRIOR ART

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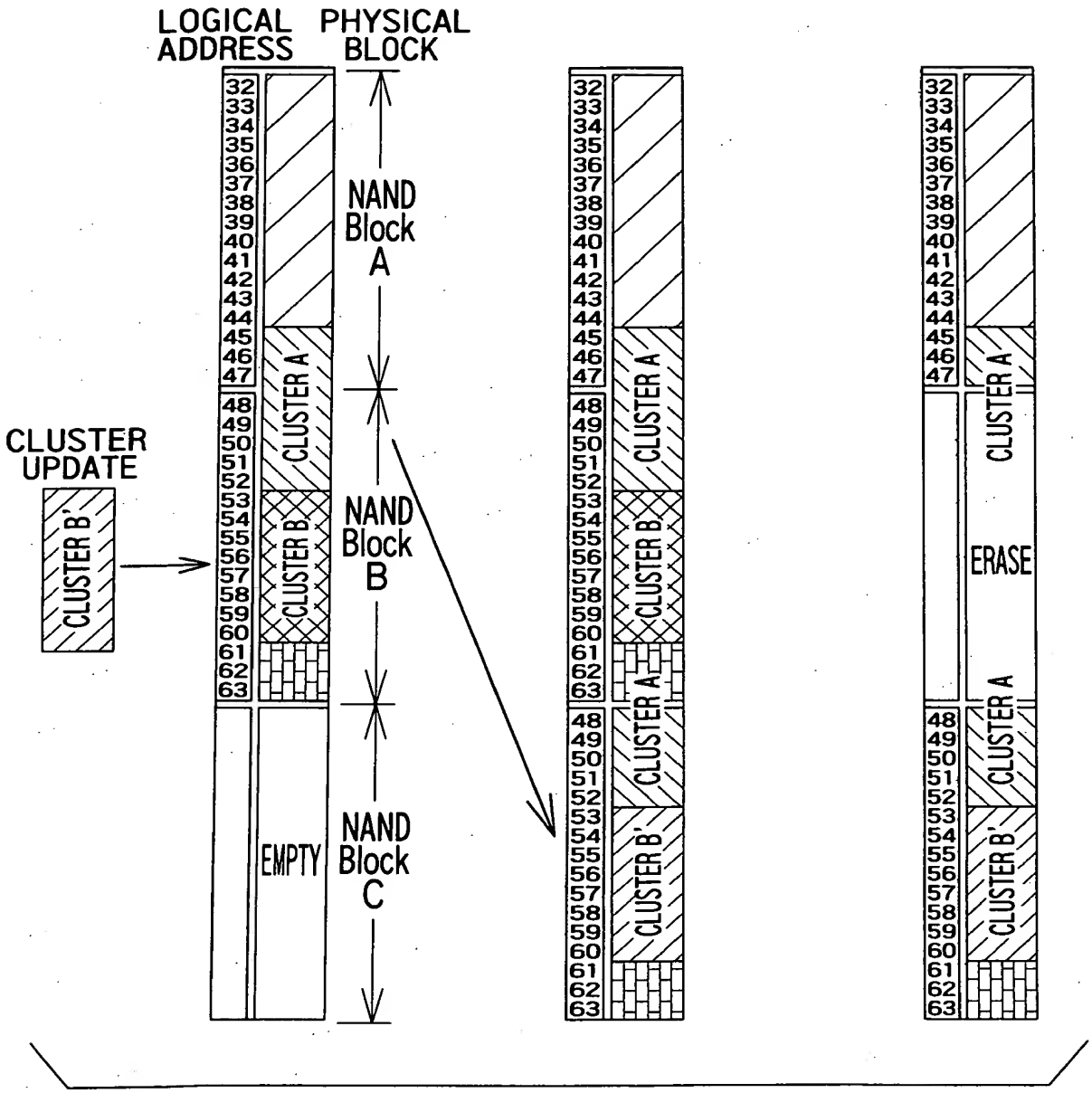

FIG. 14

PRIOR ART

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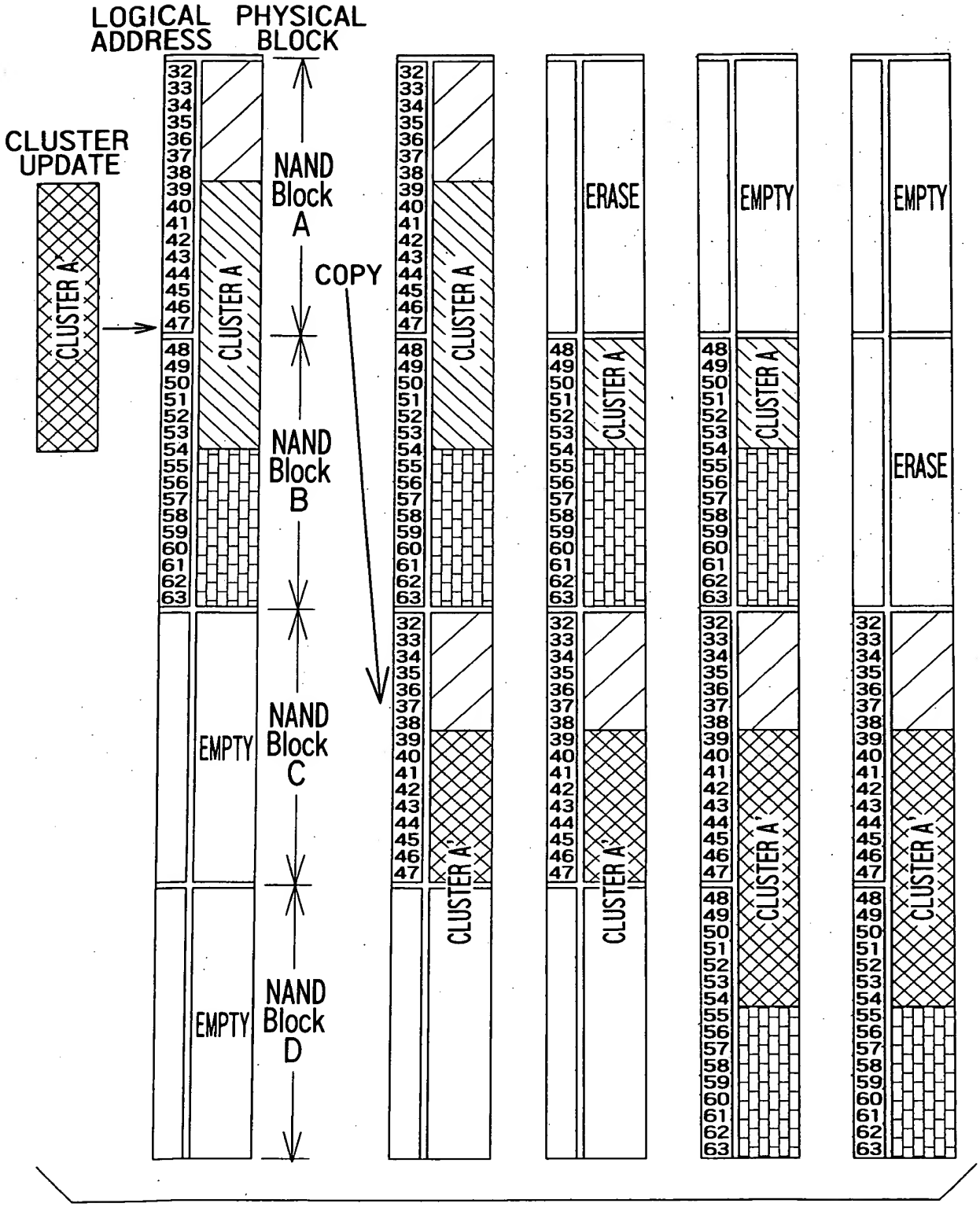

FIG. 15
PRIOR ART

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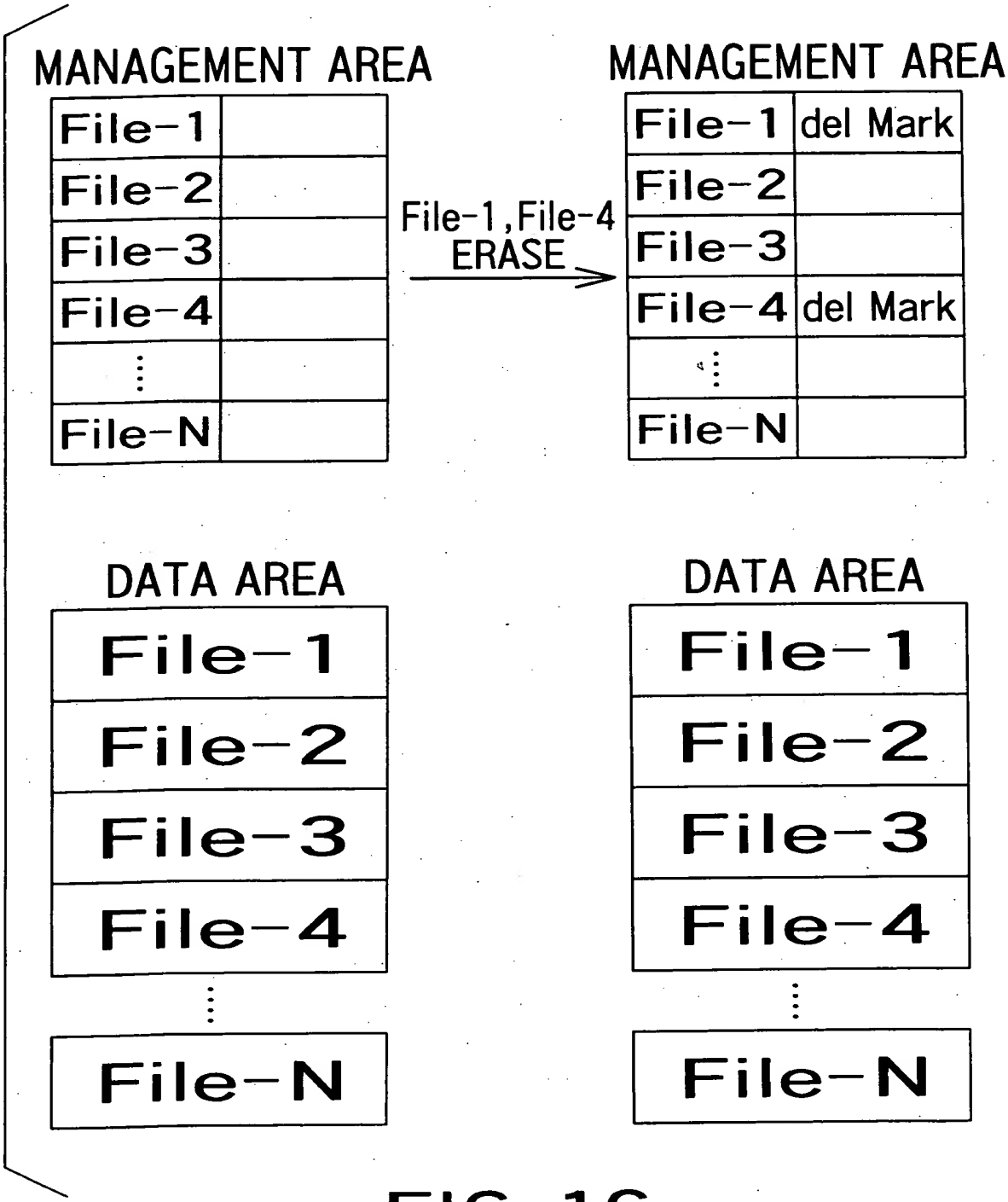

FIG. 16

PRIOR ART

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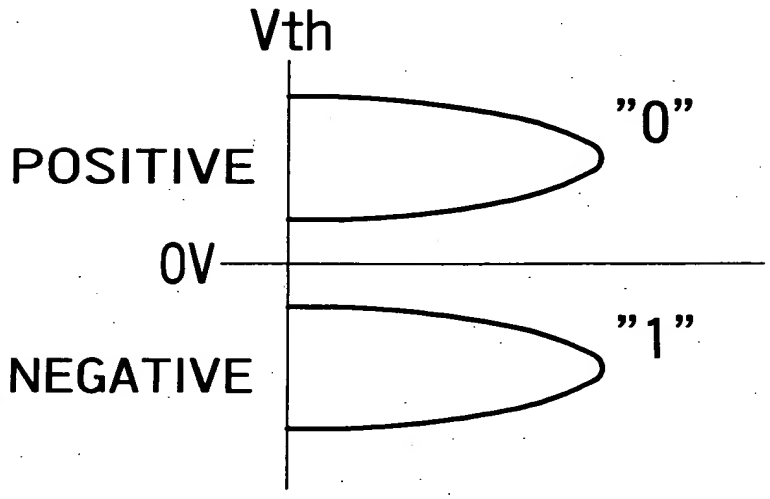

FIG. 17
PRIOR ART

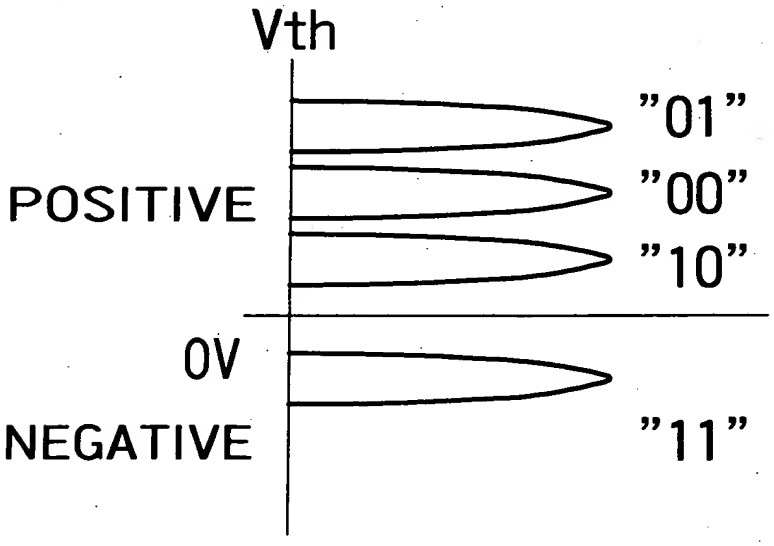

FIG. 18
PRIOR ART

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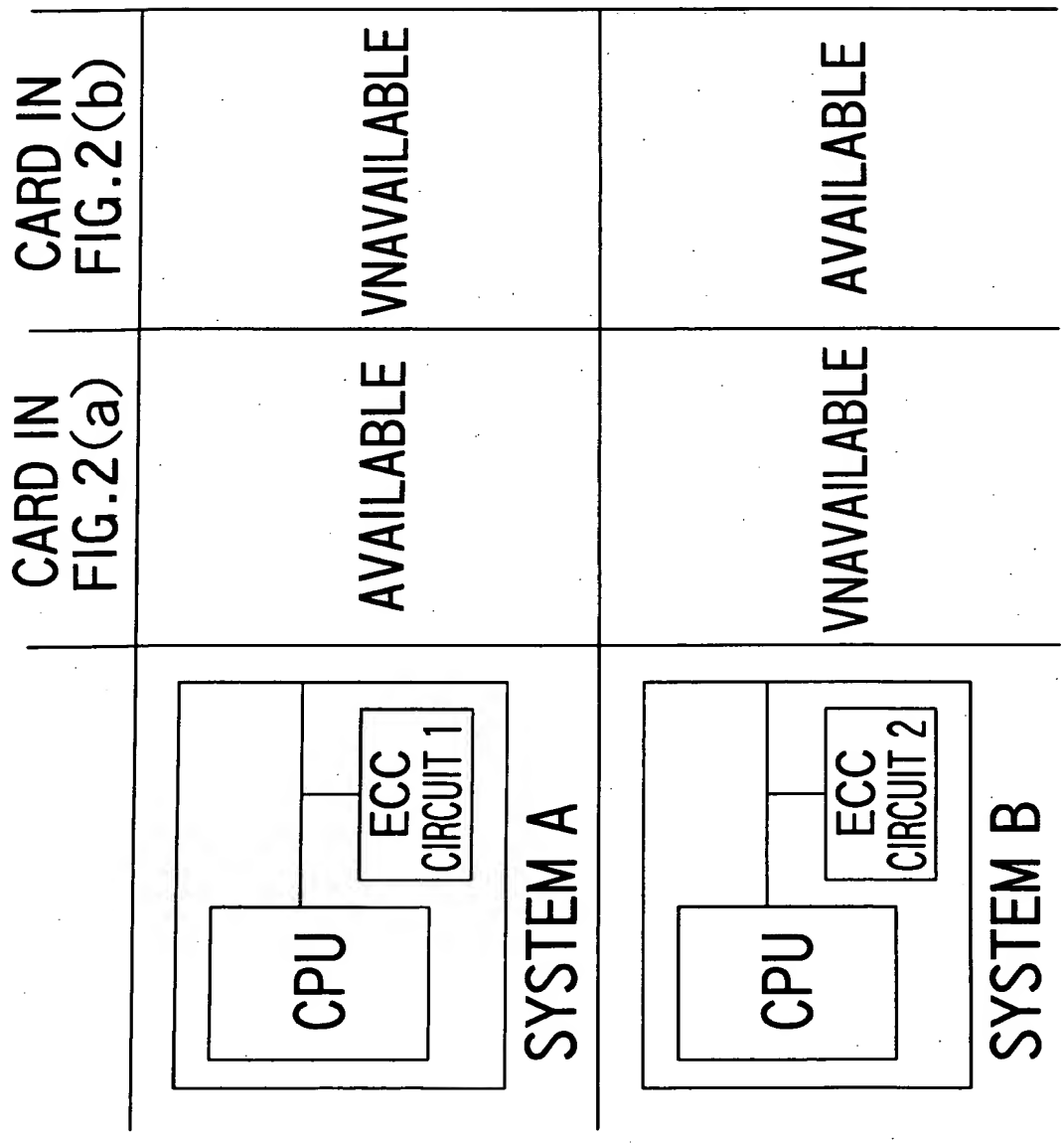

FIG. 19
PRIOR ART

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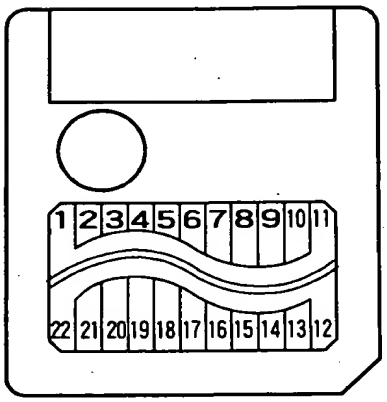

FIG.20

1,10,11	Vss	POWER SUPPY(GND)
2	CLE	COMMAND LATCH ENABLE
3	ALE	ADDRESS LATCH ENABLE
4	$\overline{WE}$	WRITE ENABLE
5	$\overline{WP}$	WRITE PROTECT
6-9	I/O_{1-4}	ADDRESS DATA COMMAND INPUT-OUTPUT PORT
13-16	I/O_{5-8}	ADDRESS DATA COMMAND INPUT-OUTPUT PORT
17	NC	N_C
18	GND	GND LEVEL INPUT
19	$R/\overline{B}$	READY BUSY OUTPUT
20	$\overline{RE}$	READ ENABLE
21	$\overline{CE}$	CHIP ENABLE
22,23	Vcc	POWER SUPPY

FIG.21

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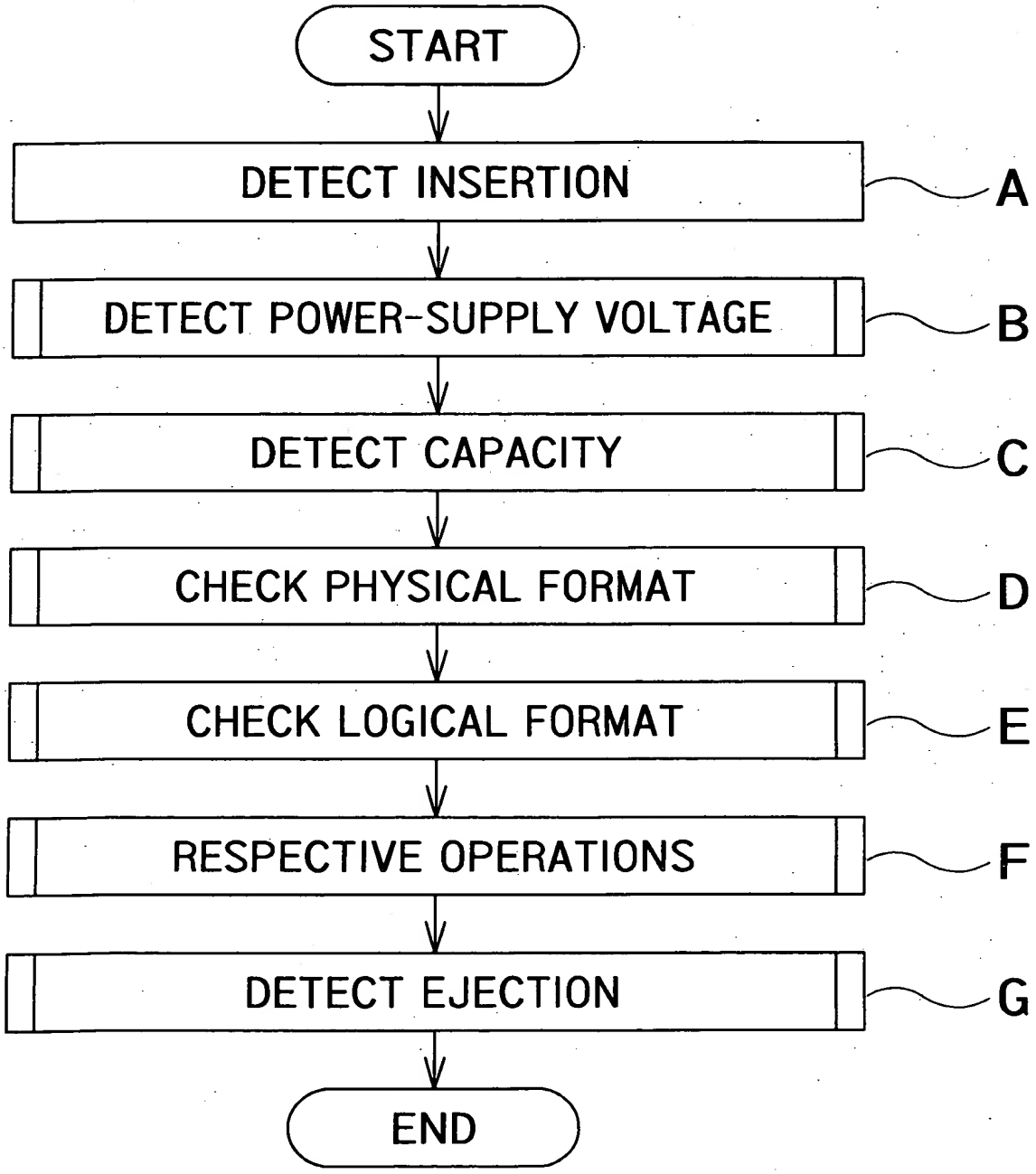

FIG. 22

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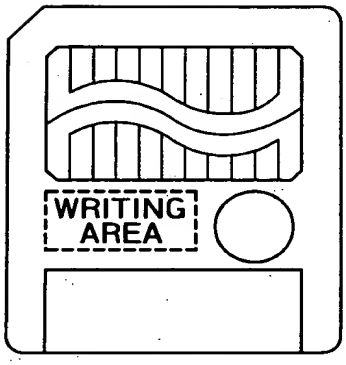
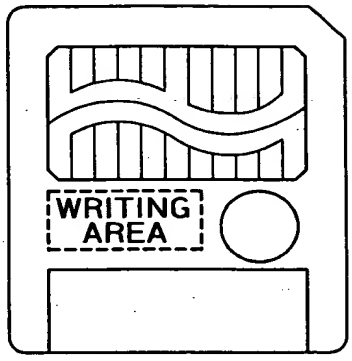


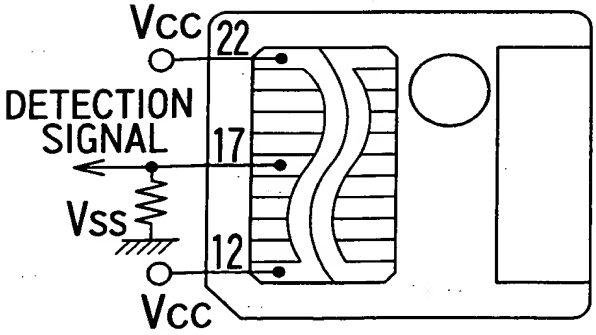
5V PRODUCT

FIG.23(a)



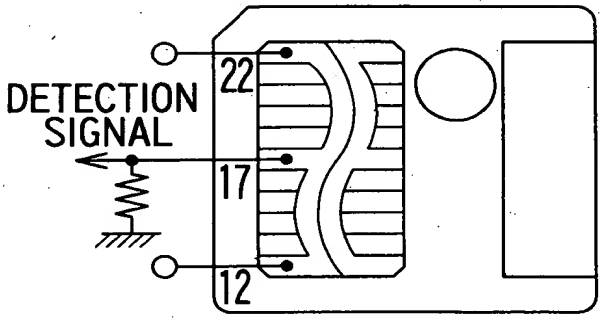
3.3V PRODUCT

FIG.23(b)



5V PRODUCT

FIG.24(a)



3.3V PRODUCT

FIG.24(b)

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21/45

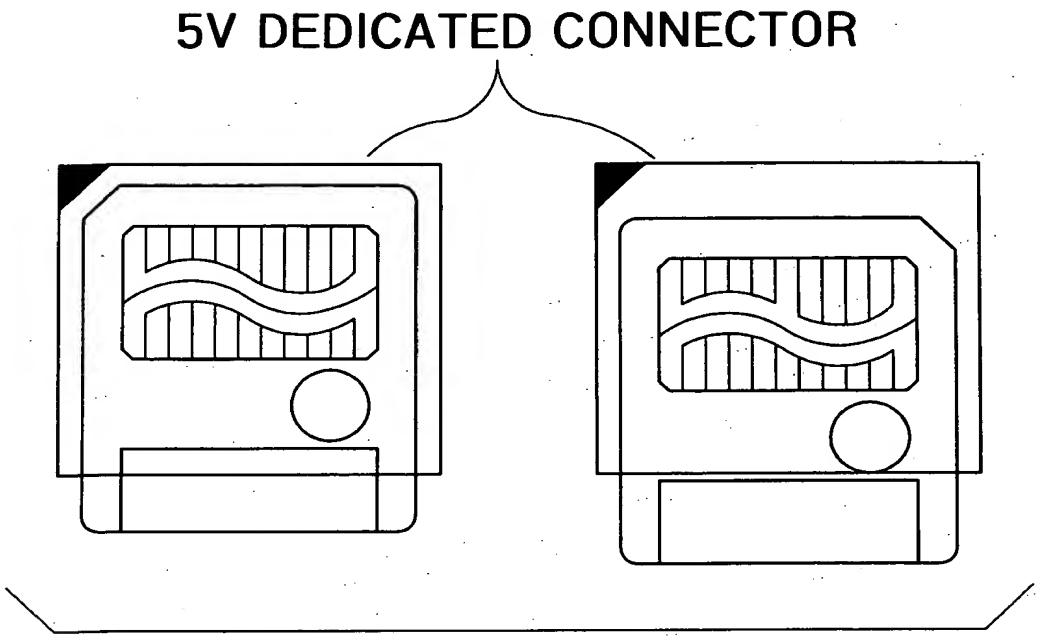

FIG. 25

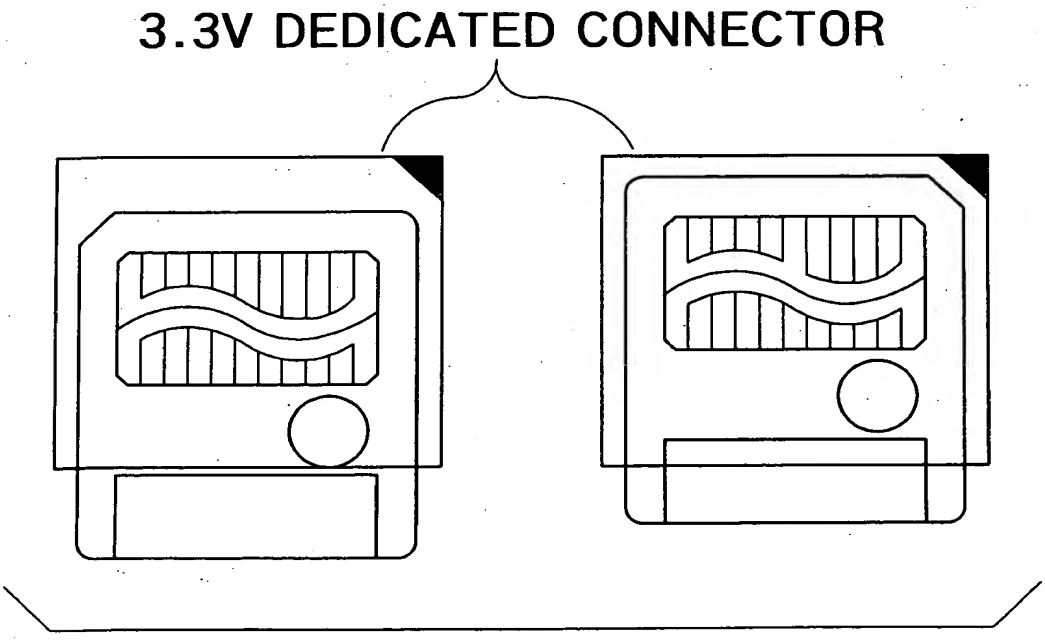

FIG. 26

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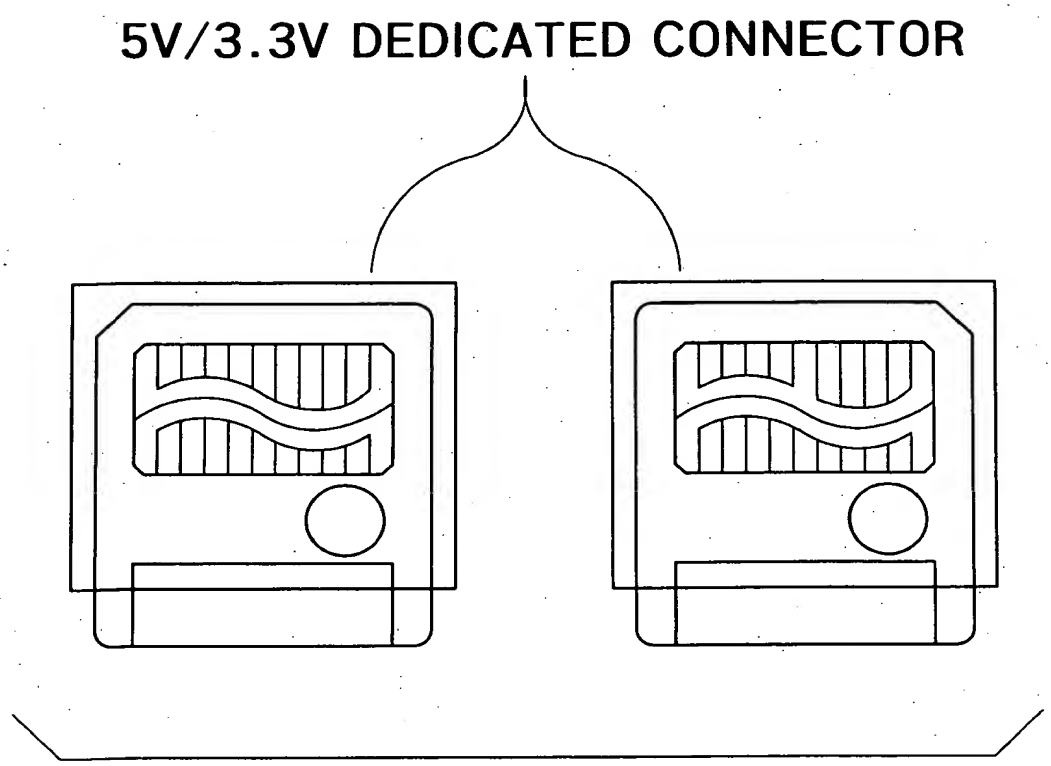

FIG. 27

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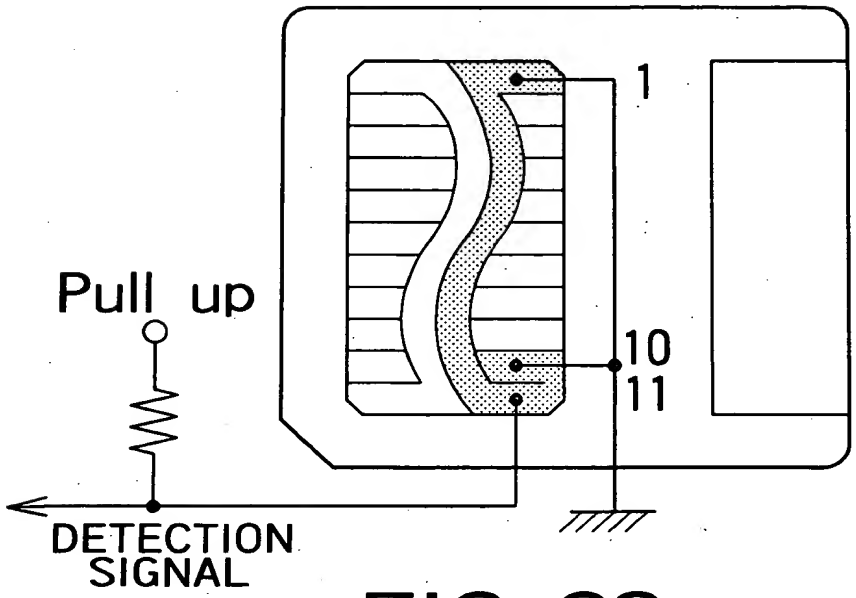

FIG. 28

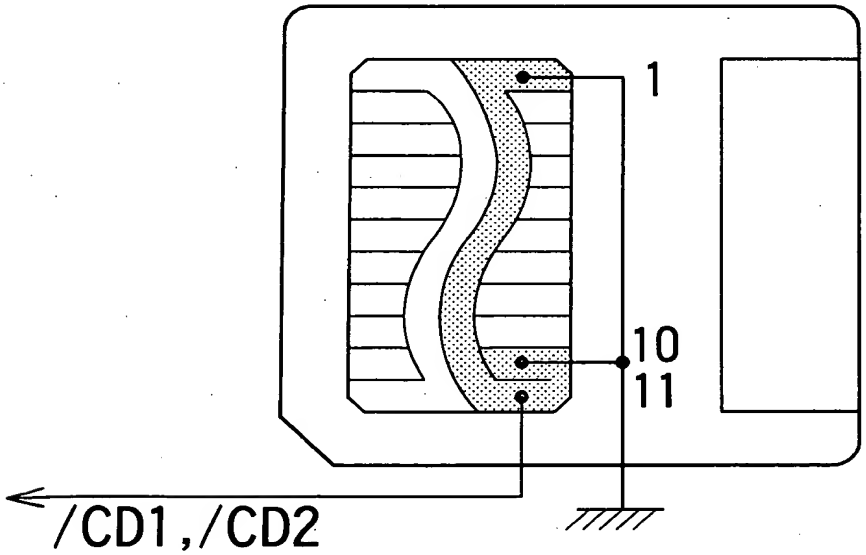

FIG. 29

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	bit7 bit6		bit1 bit0	
1stByte	00000000 111	00000000 110	00000000 001	00000000 000
2ndByte	00000000 111	00000001 110	00000001 001	00000001 000
	⋮	⋮	⋮	⋮
255thByte	11111110 111	11111110 110	11111110 001	11111110 000
266thByte	11111111 111	11111111 110	11111111 001	11111111 000

FIG.30

LP00=D(*******0、***) 、LP01=D(*******1、***)
LP02=D(******0*、***) 、LP03=D(******1*、***)
LP04=D(*****0**、***) 、LP05=D(*****1**、***)
LP06=D(****0***、***) 、LP07=D(****1***、***)
LP08=D(***0****、***) 、LP09=D(***1****、***)
LP010=D(**0*****、***) 、LP011=D(**1*****、***)
LP012=D(*0******、***) 、LP013=D(*1******、***)
LP014=D(0*******、***) 、LP015=D(1*******、***)
LP00=D(********、**0) 、LP01=D(********、**1)
LP02=D(********、*0*) 、LP03=D(********、*1*)
LP04=D(********、0**) 、LP05=D(********、1**)

FIG.31

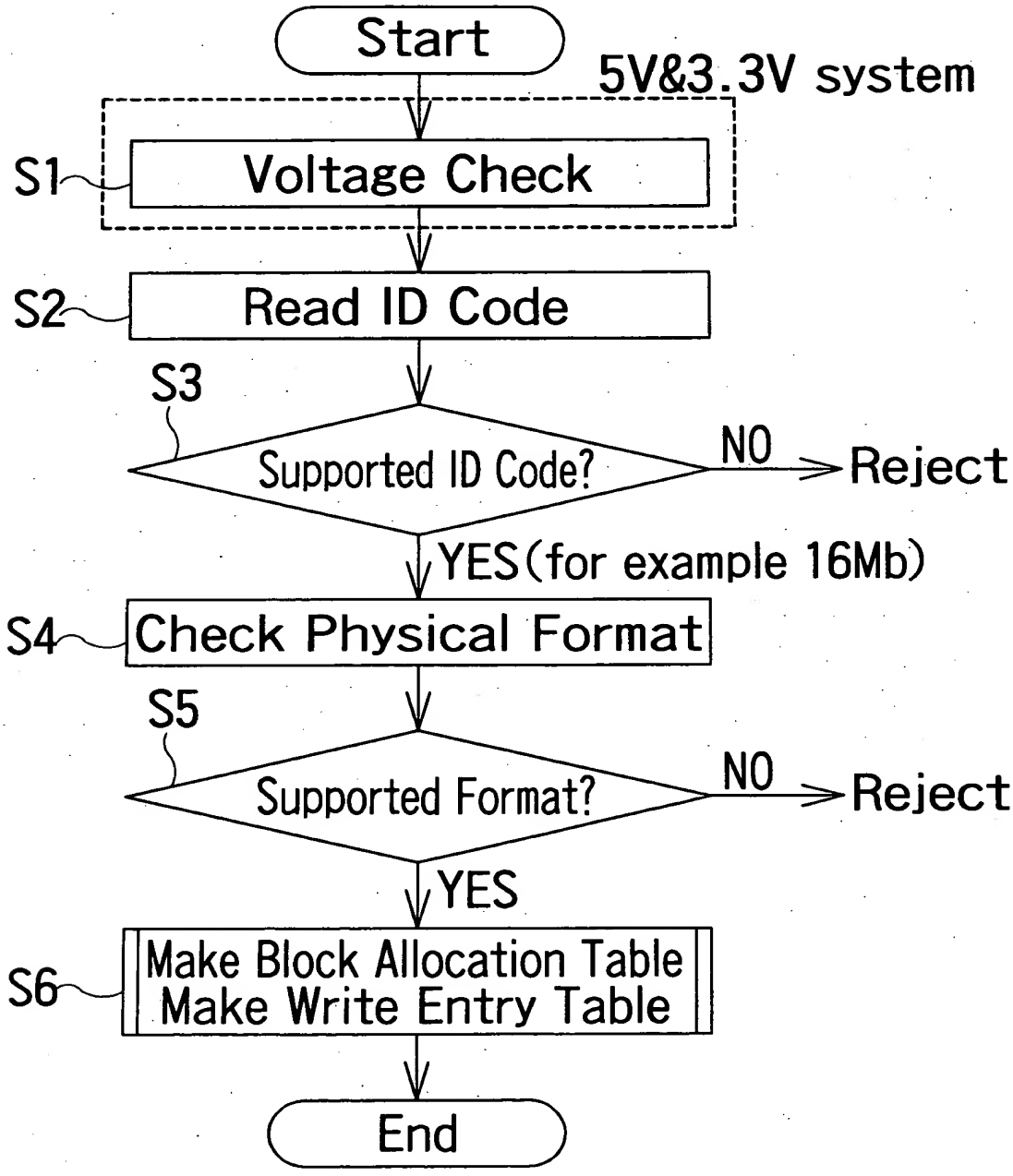
Start
5V&3.3V system
S1
Voltage Check
S2
Read ID Code
S3
Supported ID Code?
NO
Reject
YES(for example 16Mb)
S4
Check Physical Format
S5
Supported Format?
NO
Reject
YES
S6
Make Block Allocation Table
Make Write Entry Table
End

FIG.32

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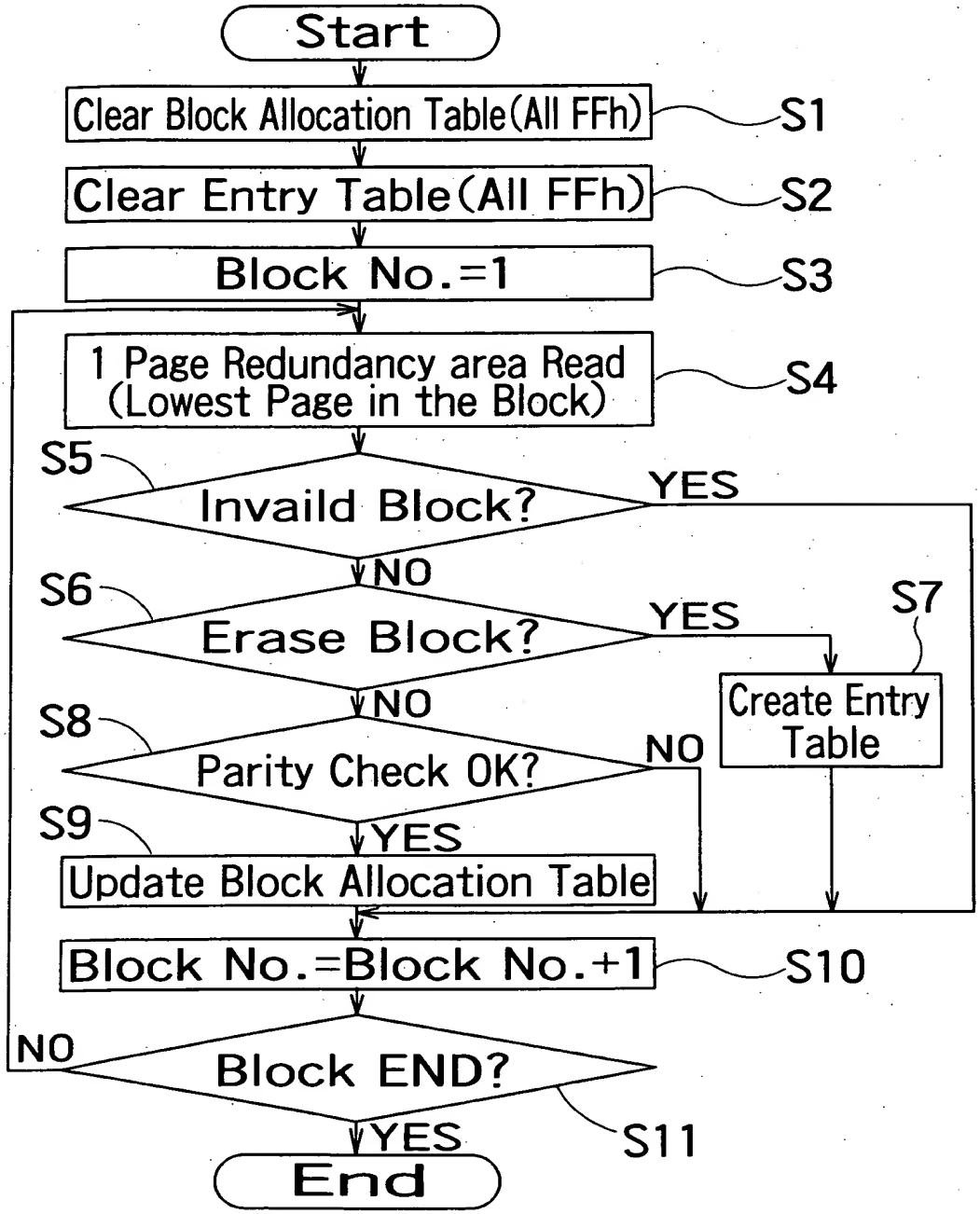

FIG. 33

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3/C29
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OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK AREA ADDRESS	PHYSICAL BLOCK AREA ADDRESS (BINARY DATA)	
Word0(LBA=0)	0	0000	0000
Word1(LBA=1)	250	1111	1010
Word2(LBA=2)	163	1010	0011
⋮	⋮	⋮	⋮
Word497(LBA=497)	122	0111	1010
Word498(LBA=498)	248	1010	1000
Word499(LBA=499)	64	0100	0000

1 PHYSICAL BLOCK AREA=2 PHYSICAL BLOCK

FIG.34

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MAR 0 6 2004
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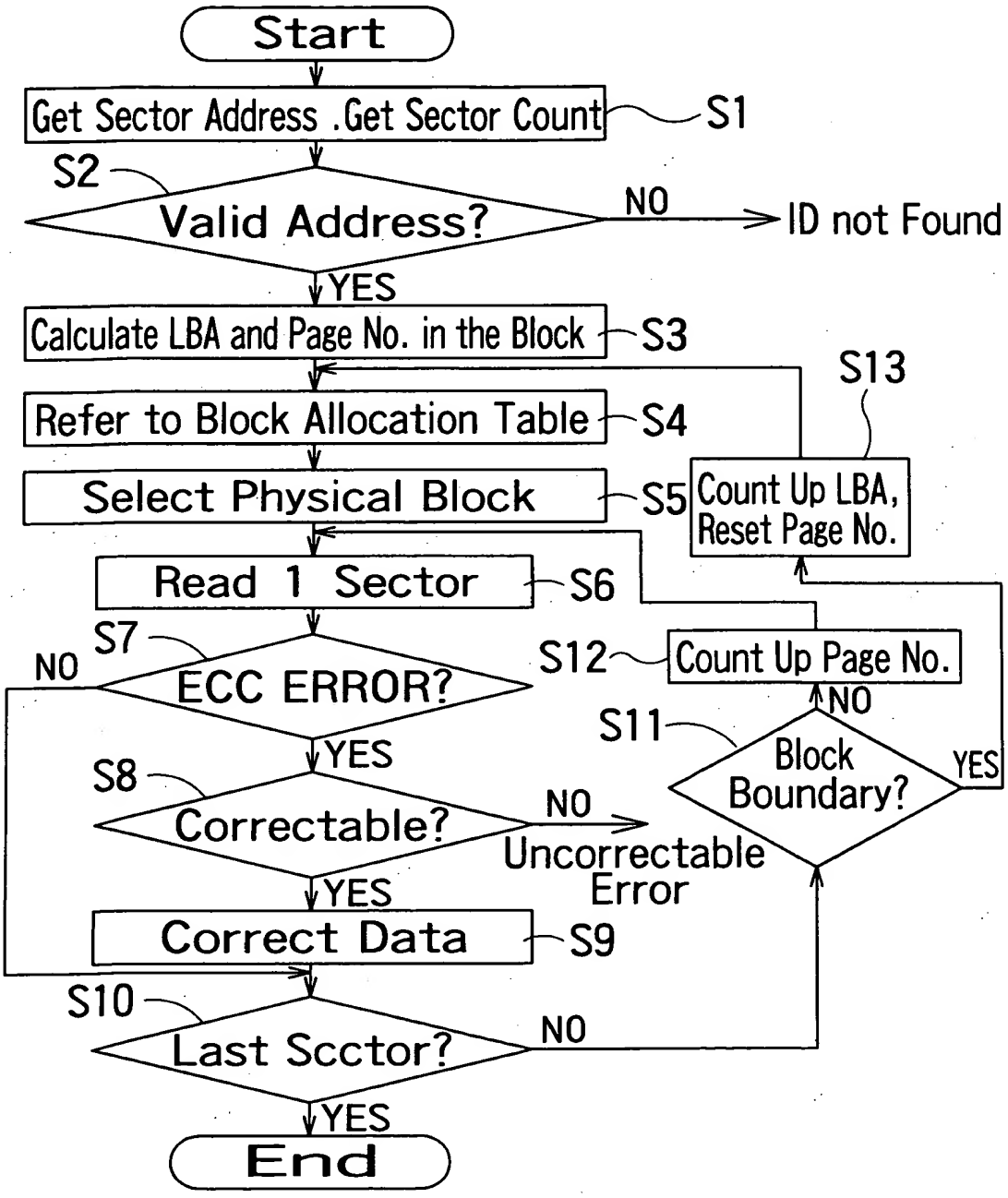

FIG. 35

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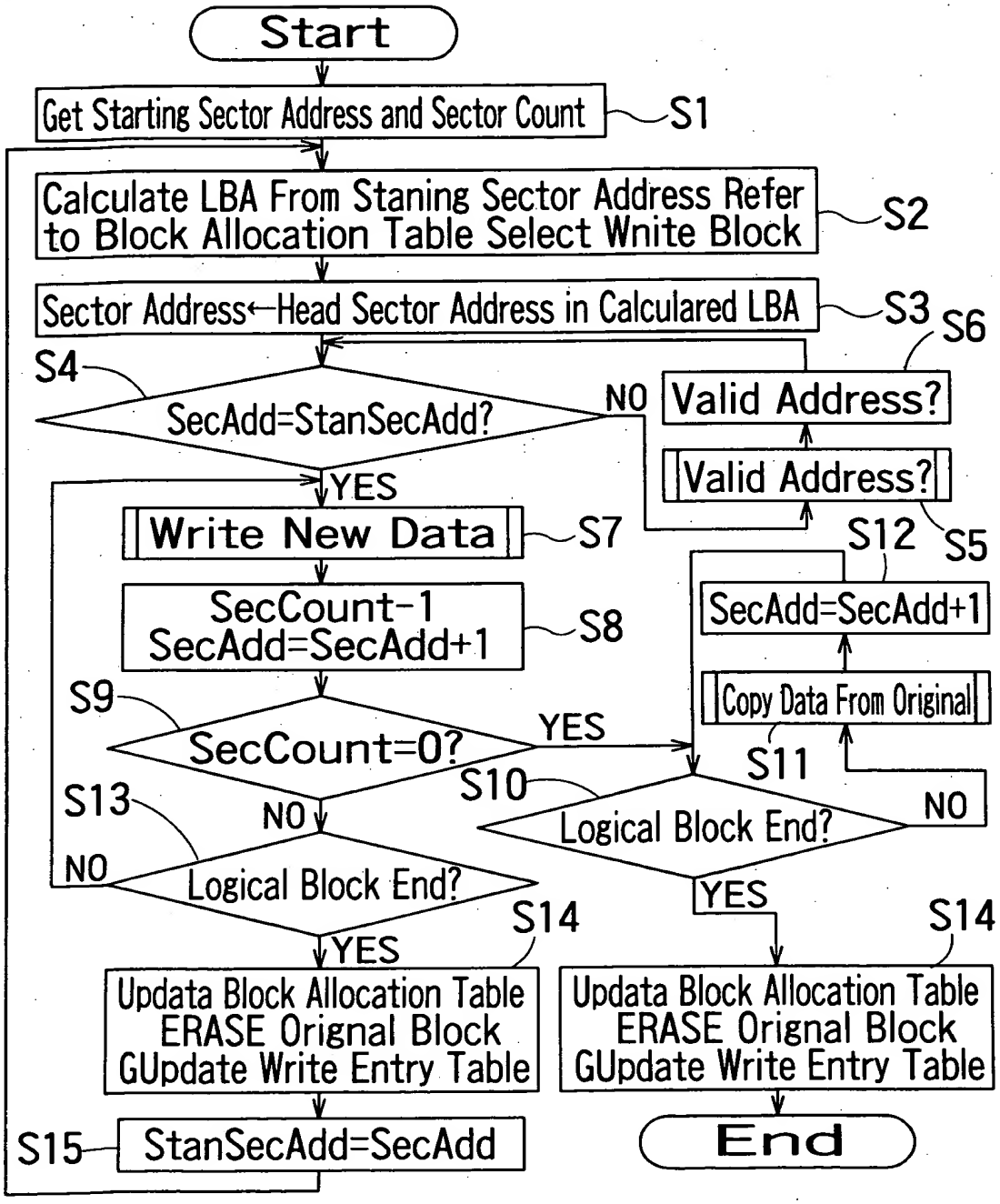

FIG. 36

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30/45

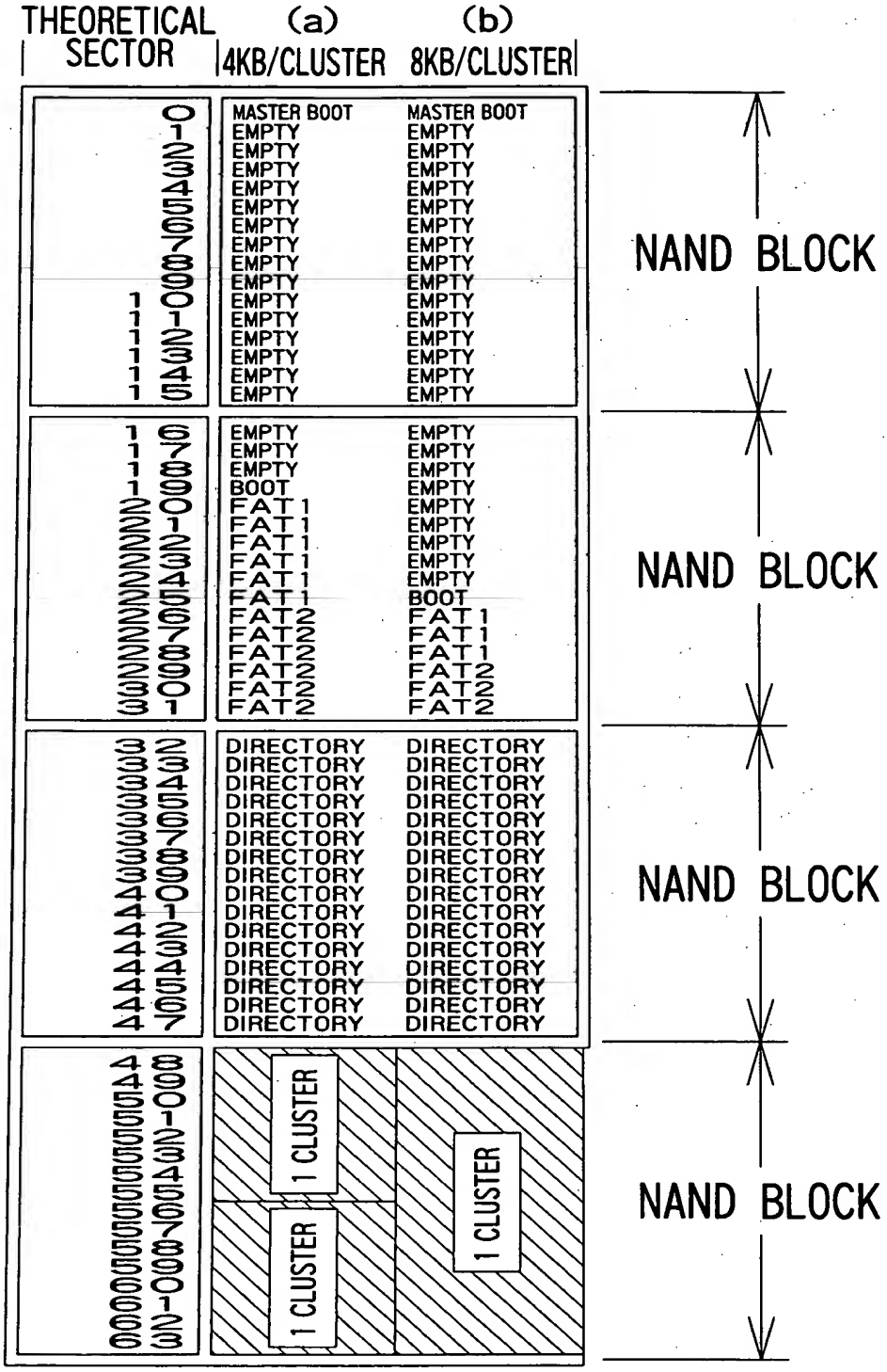

FIG. 37

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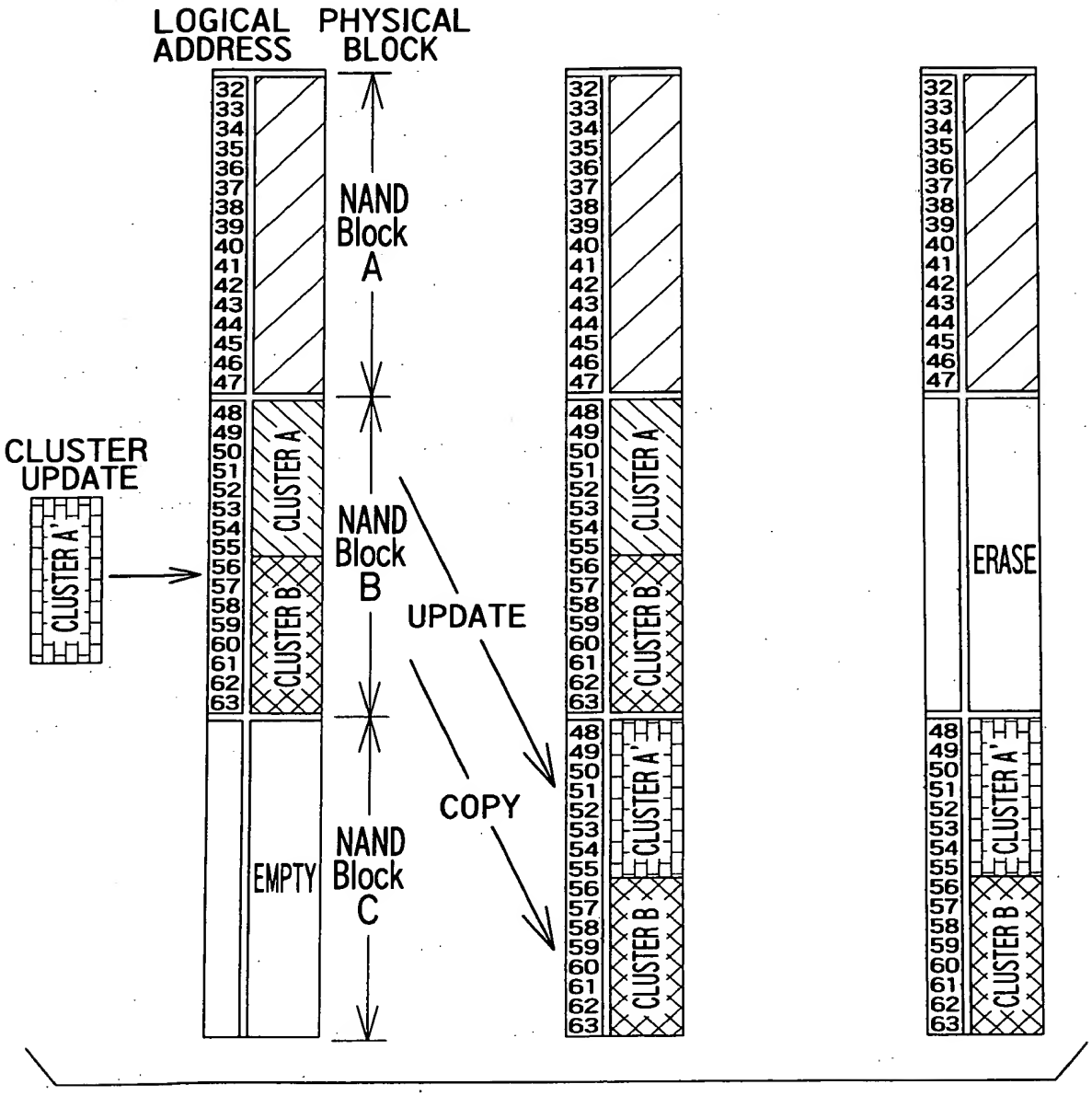

FIG. 38

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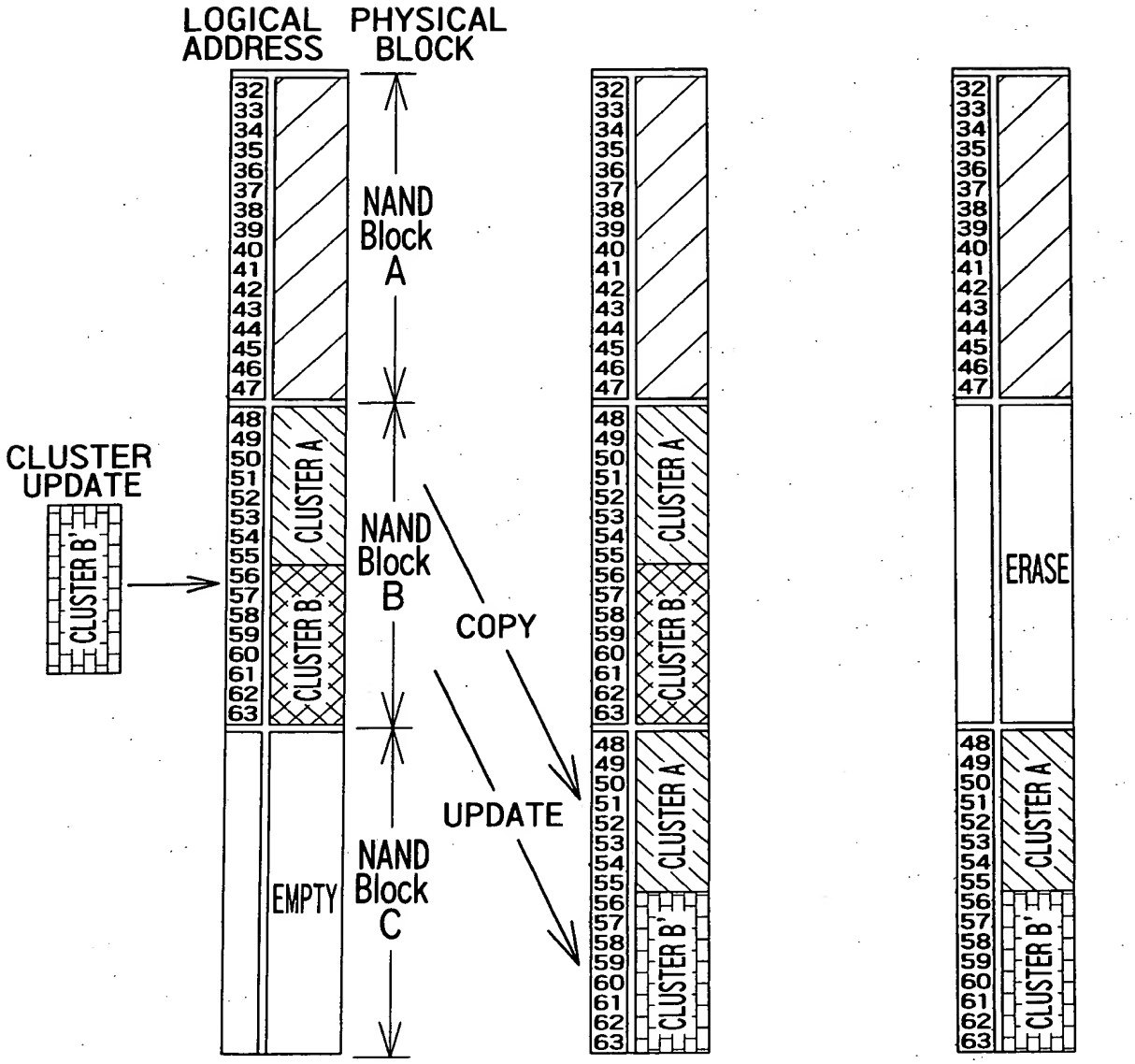

FIG. 39

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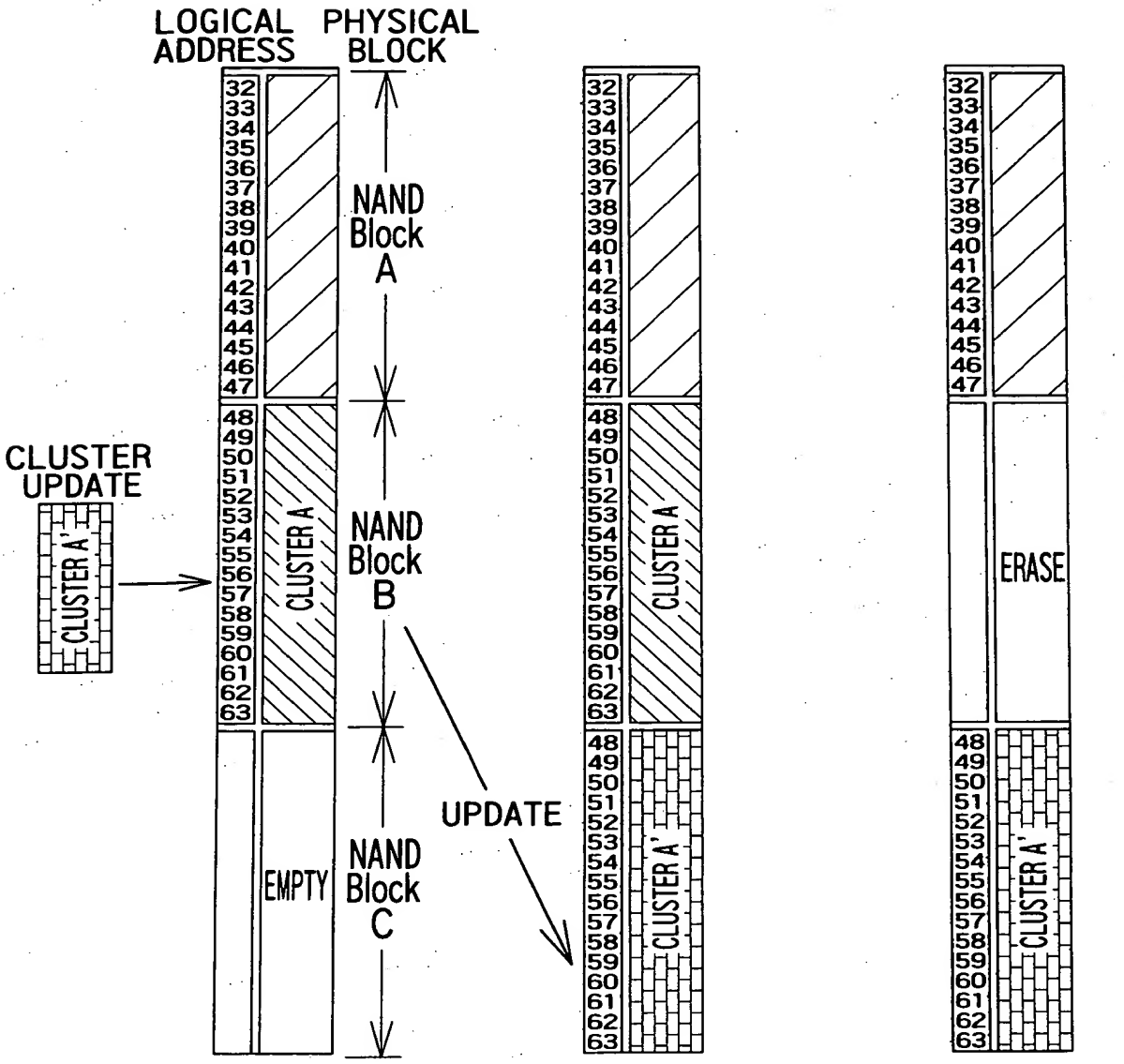

FIG.40

OIPE
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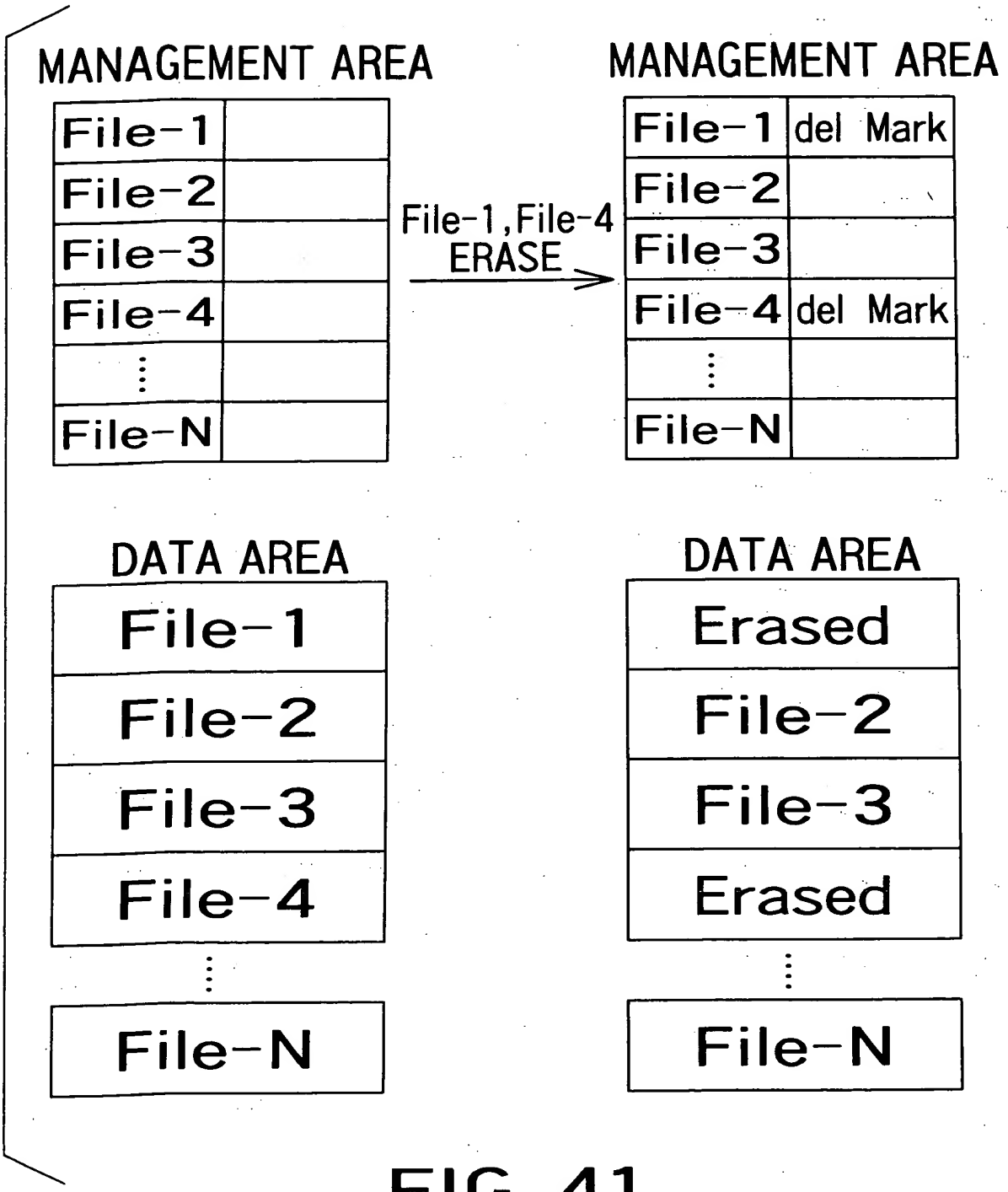

FIG.41

OIPE
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OFFSET (LOGICAL BLOCK ADDRESS)	(PHYSICAL BLOCK ADDRESS)	
	Upper Byte	Lower Byte
Word0(LBA=0)	Physical Block Upper Address	Physical Block Lower Address
Word1(LBA=1)	Physical Block Upper Address	Physical Block Lower Address
Word2(LBA=2)	Physical Block Upper Address	Physical Block Lower Address
⋮		
Word247(LBA=247)	Physical Block Upper Address	Physical Block Lower Address
Word248(LBA=248)	Physical Block Upper Address	Physical Block Lower Address
Word249(LBA=249)	Physical Block Upper Address	Physical Block Lower Address

FIG.42(a)

OFFSET (LOGICAL BLOCK ADDRESS)	(PHYSICAL BLOCK ADDRESS)	
	Upper Byte	Lower Byte
Word0(LBA=250)	Physical Block Upper Address	Physical Block Lower Address
Word1(LBA=251)	Physical Block Upper Address	Physical Block Lower Address
Word2(LBA=252)	Physical Block Upper Address	Physical Block Lower Address
⋮		
Word247(LBA=497)	Physical Block Upper Address	Physical Block Lower Address
Word248(LBA=498)	Physical Block Upper Address	Physical Block Lower Address
Word249(LBA=499)	Physical Block Upper Address	Physical Block Lower Address

FIG.42(b)

OIPE
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JC29

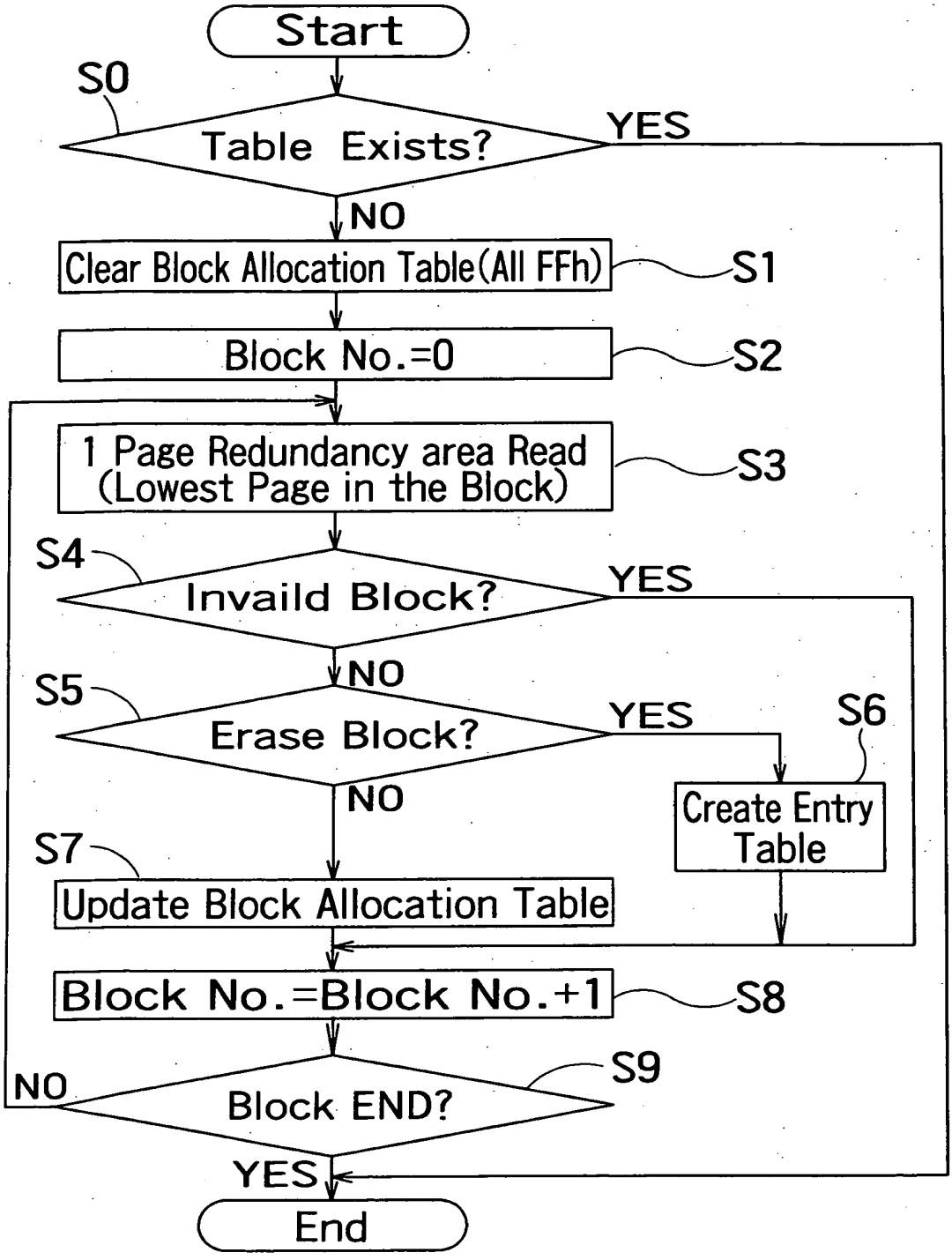

FIG.43

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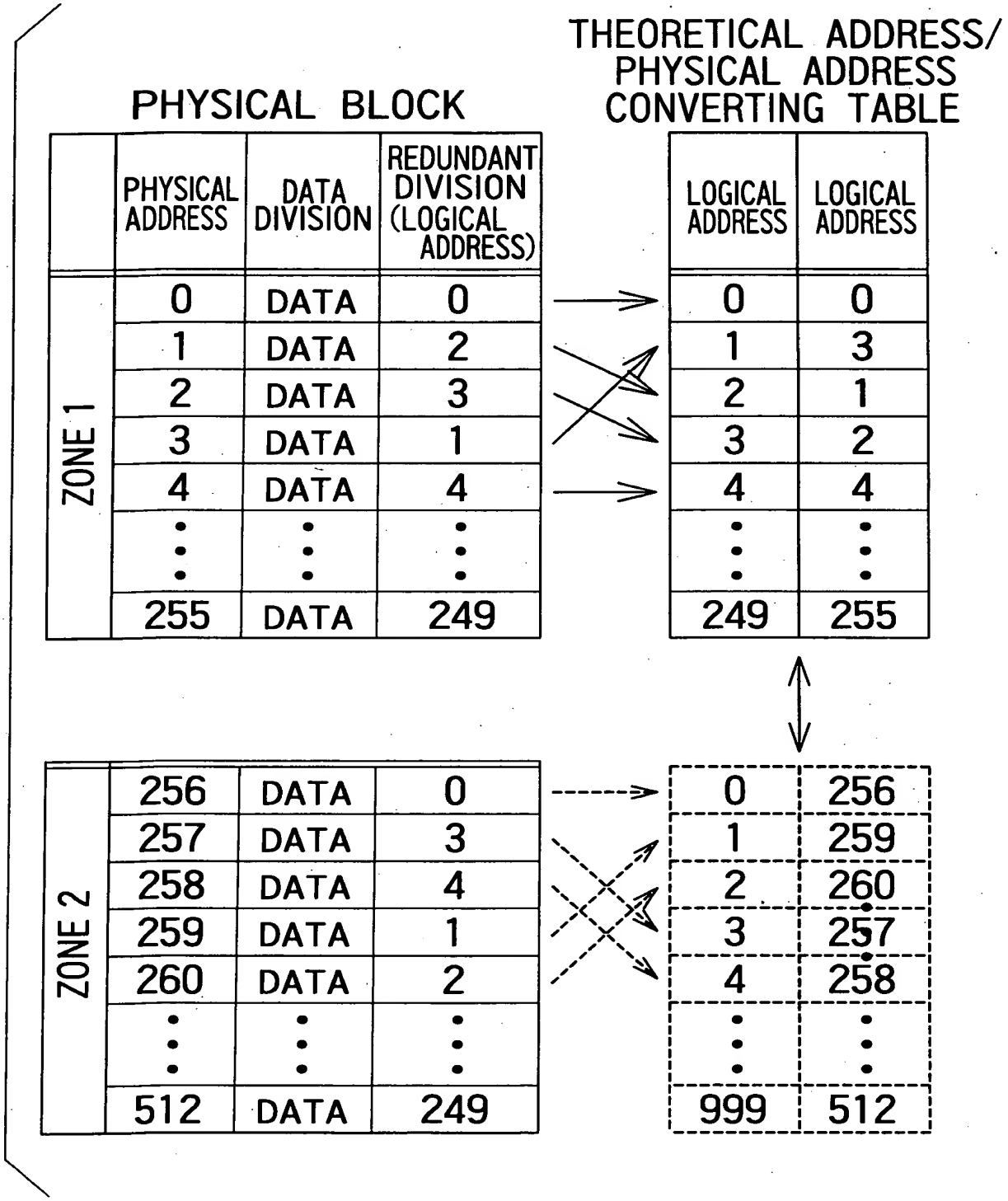

FIG. 44

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	OFFSET (LOGICAL BLOCK ADDRESS)	PHYSICAL BLOCK ADDRESS	PHYSICAL BLOCK ADDRESS (BINARY DATA)		
ZONE 1	Word0 (LBA=0)	0	0000	0000	0000
	Word2 (LBA=2)	227	0000	1110	0011
	⋮	⋮	⋮	⋮	⋮
	Word254 (LBA=254)	244	0000	1111	0100
	Word255 (LBA=255)	128	0000	1000	0111
ZONE 2	Word256 (LBA=256)	256(256-256=0)	0000	0000	0000
	Word257 (LBA=257)	327(327-256=71)	0000	0100	0111
	⋮	⋮	⋮	⋮	⋮
	Word499 (LBA=499)	500(500-256=244)	0000	1110	0000
	Word500 (LBA=500)	428(428-256=172)	0000	1010	1100

FIG. 45

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39/45

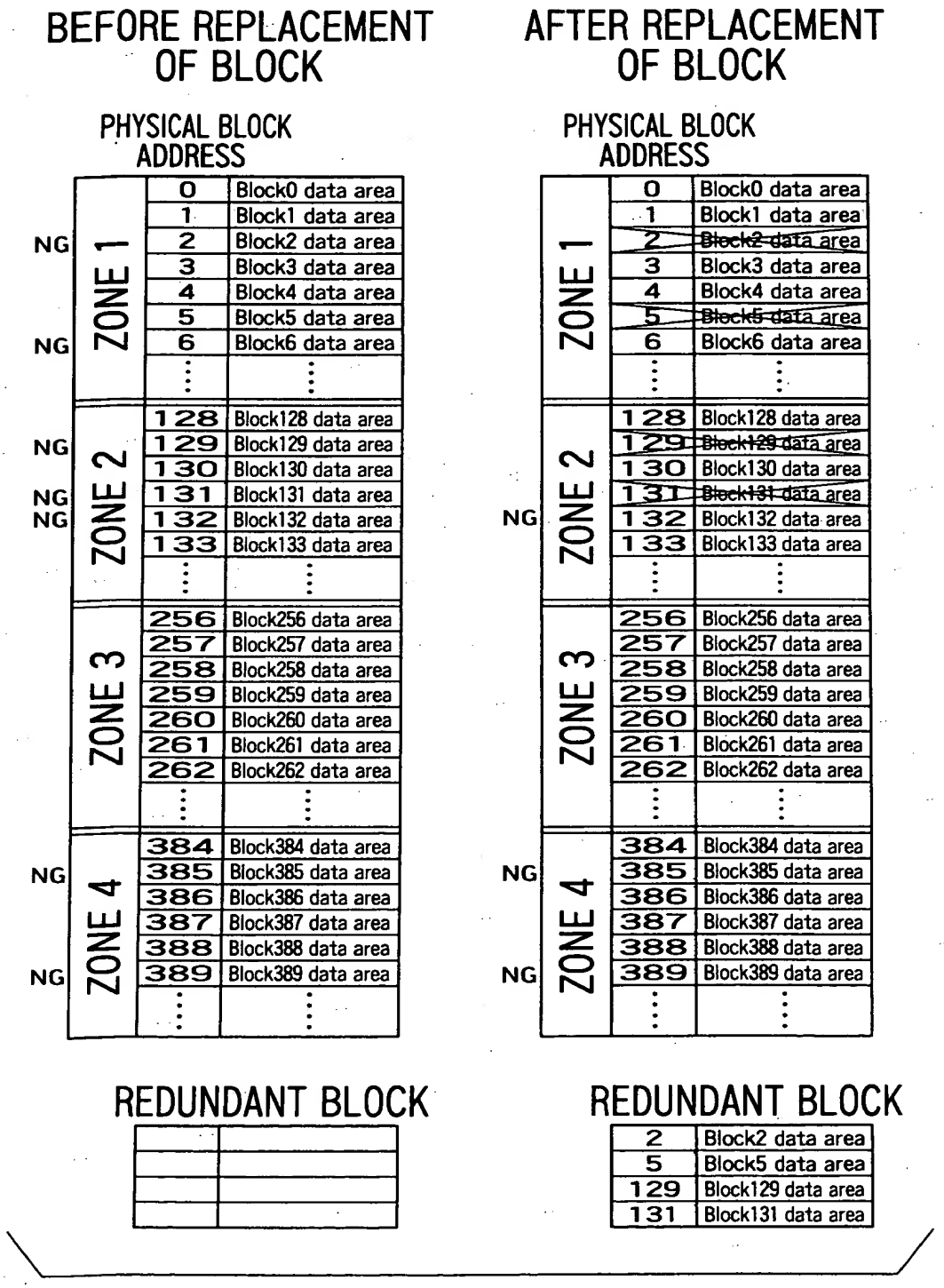

FIG.46

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BEFORE REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

NG	0	Block0 data area
	1	Block1 data area
NG	2	Block2 data area
	3	Block3 data area
	4	Block4 data area
NG	5	Block5 data area
NG	6	Block6 data area
	7	Block7 data area
	8	Block8 data area
NG	9	Block9 data area
	10	Block10 data area
NG	11	Block11 data area
	12	Block12 data area
	13	Block13 data area
	14	Block14 data area
	⋮	⋮
NG	256	Block256 data area
	257	Block257 data area
	258	Block258 data area
NG	259	Block259 data area
	260	Block260 data area
NG	261	Block261 data area
	262	Block262 data area
	263	Block263 data area
NG	264	Block264 data area
NG	265	Block265 data area
	266	Block266 data area
	267	Block267 data area
	268	Block268 data area
NG	269	Block269 data area
	⋮	⋮

REDUNDANT BLOCK

AFTER REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

	~~0~~	~~Block0 data area~~	REDUNDANT BLOCK ∧ HARDWARE REDUNDANT
	1	Block1 data area	
	~~2~~	~~Block2 data area~~	REDUNDANT BLOCK ∧ HARDWARE REDUNDANT
	3	Block3 data area	
	~~4~~	~~Block4 data area~~	REDUNDANT BLOCK ∧ HARDWARE REDUNDANT
	~~5~~	~~Block5 data area~~	REDUNDANT BLOCK ∧ HARDWARE REDUNDANT
	6	Block6 data area	
	7	Block7 data area	
	8	Block8 data area	
	9	Block9 data area	
	10	Block10 data area	
	~~11~~	~~Block11 data area~~	REDUNDANT BLOCK ∧ HARDWARE REDUNDANT
	12	Block12 data area	
	13	Block13 data area	
	14	Block14 data area	
	⋮	⋮	
NG	256	Block256 data area	
	257	Block257 data area	
	258	Block258 data area	
NG	259	Block259 data area	
	260	Block260 data area	
NG	261	Block261 data area	
	262	Block262 data area	
	263	Block263 data area	
NG	264	Block264 data area	
NG	265	Block265 data area	
	266	Block266 data area	
	267	Block267 data area	
	268	Block268 data area	
NG	269	Block269 data area	
	⋮	⋮	

REDUNDANT BLOCK

0	Block0 data area
2	Block2 data area
4	Block4 data area
5	Block5 data area
9	Block9 data area
11	Block11 data area

FIG. 47

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BEFORE REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

NG	ZONE 1	0	Block0 data area
		1	Block1 data area
NG		2	Block2 data area
		3	Block3 data area
		4	Block4 data area
		5	Block5 data area
NG		6	Block6 data area
		⋮	⋮
NG	ZONE 2	128	Block128 data area
		129	Block129 data area
		130	Block130 data area
NG		131	Block131 data area
NG		132	Block132 data area
		133	Block133 data area
		⋮	⋮
	ZONE 3	256	Block256 data area
		257	Block257 data area
		258	Block258 data area
		259	Block259 data area
		260	Block260 data area
		261	Block261 data area
		262	Block262 data area
		⋮	⋮
NG	ZONE 4	384	Block384 data area
		385	Block385 data area
		386	Block386 data area
		387	Block387 data area
		388	Block388 data area
NG		389	Block389 data area
		⋮	⋮

REDUNDANT BLOCK

AFTER REPLACEMENT OF BLOCK

PHYSICAL BLOCK ADDRESS

	ZONE 1	0	Block0 data area
		1	Block1 data area
		2	~~Block2 data area~~
		3	Block3 data area
		4	Block4 data area
NG		5	Block5 data area
		6	Block6 data area
		⋮	⋮
	ZONE 2	128	Block128 data area
		129	~~Block129 data area~~
		130	Block130 data area
		131	~~Block131 data area~~
NG		132	Block132 data area
		133	Block133 data area
		⋮	⋮
	ZONE 3	256	Block256 data area
		257	Block257 data area
		258	Block258 data area
		259	Block259 data area
		260	Block260 data area
		261	Block261 data area
		262	Block262 data area
		⋮	⋮
	ZONE 4	384	Block384 data area
		385	~~Block385 data area~~
		386	Block386 data area
		387	Block387 data area
		388	Block388 data area
NG		389	Block389 data area
		⋮	⋮

REDUNDANT BLOCK

129	Block129data area
131	Block131 data area
2	Block2 data area
385	Block385 data area

FIG. 48

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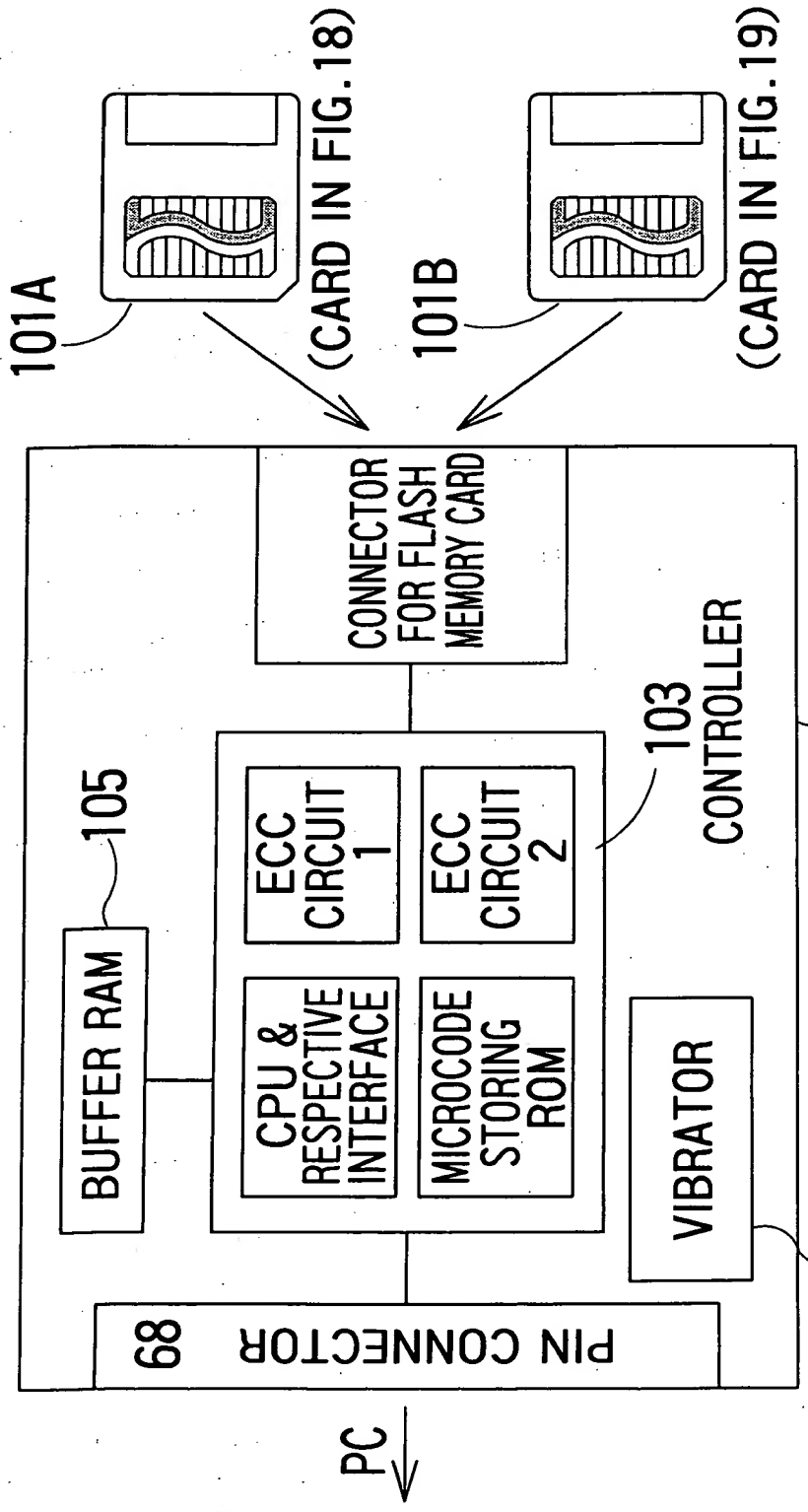

FIG.49

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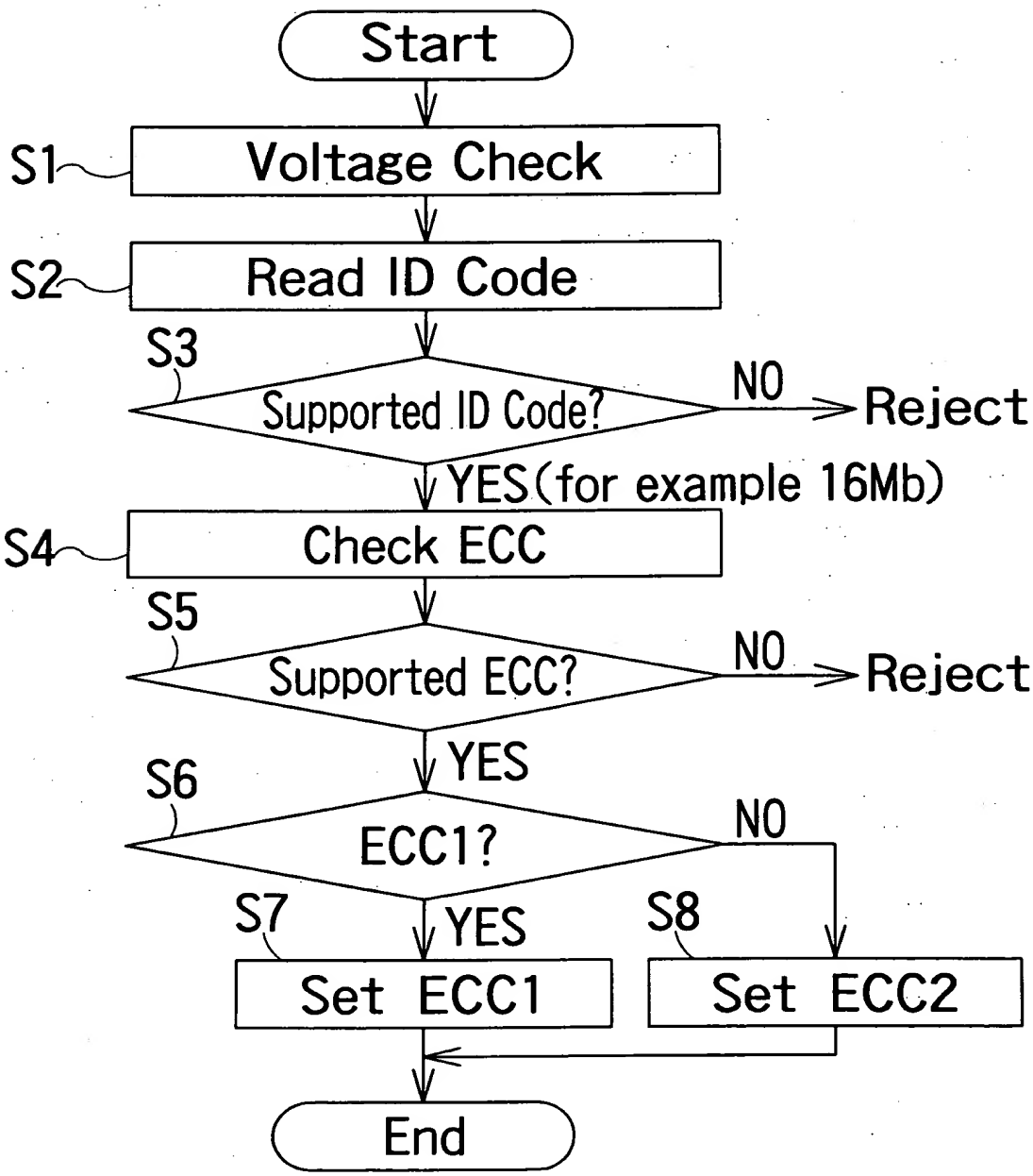

FIG.50

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DATA DIVISION

BYTE	PAGE 0(EVEN PAGE)	PAGE 1(ODD PAGE)
0~255	DATA Area-1	DATA Area-2

REDUNDANT DIVISION

BYTE	EVEN PAGE	ODD PAGE
256	ECC Flag Area	ECC Area-2
257	ECC Area-3	
258		
259		Block Address Area-2
260	Data Status Area	
261	Block Status Area	ECC Area-1
262	Block Address Area-1	
263		

FIG.51

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	ECC-AREA1	ECC-AREA2	ECC-AREA3	ECC-AREA4
ECC METHOD 1	ECC CODE FOR DATA AREA-1	ECC CODE FOR DATA AREA-2	NULL (ALL "FFh")	ECC1-FLAG
ECC METHOD 2	ECC CODE FOR DATA AREA-1,2	ECC CODE FOR DATA AREA-1,2	ECC CODE FOR DATA AREA-1,2	ECC2-FLAG

FIG.52